AT&T HARDBALL? Critics say AT&T and its cable allies are playing hardball to stop open access for ISPs. **Page 32.**

SOFTWARE SULTAN IBM and Lotus exec Mike Zisman is grilled on the future of messaging and knowledge management. **Page 41.**

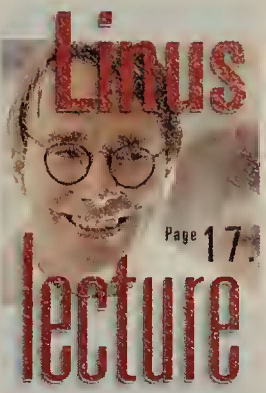
The newsweekly of enterprise network computing

NetworkWorld

October 11, 1999 Volume 16, Number 41

The network portal: www.nwfusion.com

Linus lecture



Page 17.

Linux creator Linus Torvalds says Sun's open source plans don't go far enough.

Larry's latest: Oracle to be its own ASP

BY JOHN COX

Only Larry Ellison, Oracle's chairman, could boast that 30 corporate customers with 2,000 users would make his company the "biggest" in anything. But when it comes to the hot new application service provider (ASP) market, the sky's the limit in hyperbole as much as revenue.

Ellison last week launched a service called Business OnLine (BOL), which lets customers who license the Oracle Applications suite run the software in the Oracle data center. End users access the various accounting, purchasing, manufacturing and other programs through a Web browser.

The cost of the suite ranges

See **Oracle**, page 86

Users blast WorldCom merger

Net integration, customer-service nightmares feared in $115 billion Sprint deal.

BY DAVID ROHDE

NEW YORK — Call it a hit on Wall Street and a bomb on Main Street.

Users last week ignored the celebration of MCI WorldCom's planned $115 billion buyout of Sprint and denounced the deal as potentially eliminating one of their most cherished options — an independent supplier of high-quality frame relay, IP, ATM and voice networks.

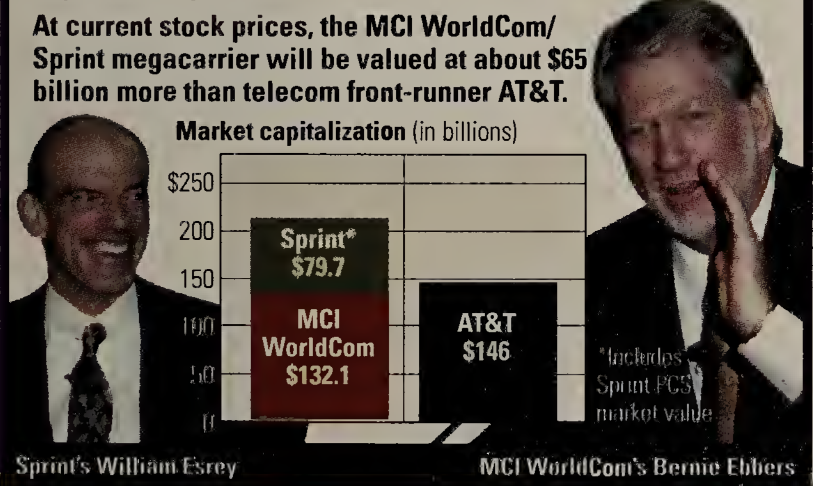
The gargantuan merger — the biggest ever in any industry — faces a minimum yearlong review by antitrust and telecommunications regulators. And there was no immediate indication whether MCI WorldCom would drop or even change any of Sprint's voice and data offerings, except for selling off its Internet backbone to gain the regulators' blessing.

Yet users and analysts fear that the combined company — to be called simply WorldCom — could face innumerable obstacles if it even attempts to integrate its collection of at least six frame relay networks and three ATM networks, in addition to the two

See **MCI WorldCom**, page 14

Big deal, big value

At current stock prices, the MCI WorldCom/Sprint megacarrier will be valued at about $65 billion more than telecom front-runner AT&T.



Sprint's William Esrey — MCI WorldCom's Bernie Ebbers

Note: Market capitalization is a company's total market value, calculated by multiplying its stock price by the number of outstanding shares.

SOURCE: [illegible]

AP/WORLD WIDE PHOTO

More merger coverage inside and online

Inside:

- What will become of Sprint's ballyhooed ION offering? **Page 16.**
- Industry watchers Lisa Pierce, Howard Anderson, Len Elfenbein and David Bower weigh in on the deal. **Pages 88 and 89.**

Online:

- MCI WorldCom's John Sidgmore's take on the transaction.
- "Will someone please take Bernie's checkbook?" That's what one reader asks in our online forum discussing the merger. Log on with your comments. **DocFinder: 5028**

David Bower

John Sidgmore

IN-SITE: *Lessons from Leading Users*

Staples bets on ATM, frame relay to deliver goods

BY JIM DUFFY

FRAMINGHAM, MASS. — Staples is fond of proclaiming: "Yeah, we've got that." And to deliver on that promise, the office products retailer just spent $2 million on a new ATM and frame relay network.

The driving force behind the network upgrade is the deployment of new applications that will improve a shopper's experience and overall customer service, says Jed Dineen, Staples' network architect. The network is also helping Staples save $120,000 annually on voice circuits, and increase bandwidth capacity for peak service times, Dineen says.

At its new company headquarters, Staples has installed a Nortel Networks' ATM campus network, moving from a switched and shared 10M and 100M bit/sec Ethernet network that was housed in three old buildings. Staples also replaced a 19.2K bit/sec satellite network for its 800 to 1,000 stores with a frame relay network to increase capacity during peak business hours. Each store now has a Nortel Advanced Remote Node router as its entry point into the frame net.

Among the new applications supported by the net-

See **Staples**, page 86

SPECIAL SECTION: Remote Access

UPenn's remote access network is very popular. But the school is migrating to an outsourced VPN. Find out why. **Page 58.**

UPenn's Deke Kassabian

RAD vs. RAS

What's the best way to go, a dedicated remote access device or a remote access card in an NT server?

Details, Page 60.

Newspaper $5.00

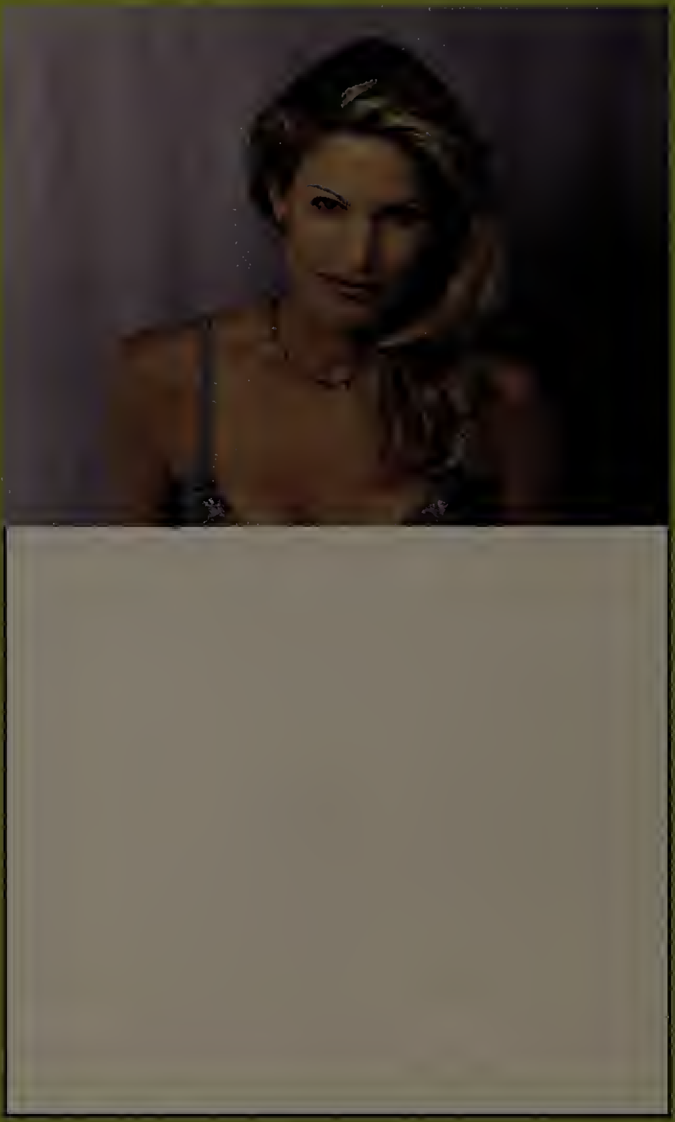


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Table of Contents

OCTOBER 11, 1999

Find out what plum job opportunity induced Cliff Duffey to move to Nashville. Page 73.

NEWS

6 Intel bolsters Internet portfolio, snaps up IPivot.
8 Novell unveils 'digitalme' adjunct to NDS.
8 Responsys.com delivers e-mail marketing service.
10 Exchange users see long upgrade road ahead.
10 Big Blue boosts front-end processors.
12 Video vendors air wares at Internet World.
88 A whole new WorldCom: Columnists' takes on the merger.

INFRASTRUCTURE

17 Sun open Solaris source code, sort of.
22 3Com unleashes barrage of small-office network gear.
26 HolonTech offers bulletproof Windows clustering box.
27 Alcatel takes aim at branch office networks.
28 Dave Kearns: Service packs that are anything but.

CARRIERS & ISPs

31 Nortel's Shasta gear adds security to DSL.
32 AT&T, cable allies accused of hardball tactics.
38 Daniel Briere and Christine Heckart: Want press? Fire booth babes, hire a limo.

ENTERPRISE APPLICATIONS

41 IBM's Zisman looks beyond messaging.
42 XML tool eases data exchange over the 'Net.
43 Financial firms investing in Web-based customer service.
44 Scott Bradner: 'Best with . . .' is bad for you.

TECHNOLOGY UPDATE

51 Network processors speed progress.
52 Gearhead: Befriend the dreaded Windows registry.

MANAGEMENT

73 Relocation rundown: If you're thinking about moving, learn what costs you can expect your employer to pay for.

OPINIONS

54 Editorial: Reluctantly in favor of a bigger MCI WorldCom.
55 Jeff Shapiro: How much is the Internet worth to you?
55 James Kobielus: Instant Messaging's dual role may play well in the enterprise.
90 Backspin: A firm investment in high tech.
90 'Net Buzz: Beware of Web sites bearing opinion polls.
Net Know-It-All ....Page 6
Ask Dr. Intranet ....Page 51
Message Queue ....Page 54
Editorial and advertiser indexes ......Page 85

Special Focus

MGMT. TECHNOLOGY

Software distribution done right. Page 49.

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FEATURES

Penn's Deke Kassabian

PHOTO BY KEVIN BISHOP

Special Section: Remote Access

The University of Pennsylvania's remote access network is popular. But the school is migrating to an outsourced VPN. Find out why. **PAGE 58.**

RAD vs. RAS: What's the best way to go, a dedicated remote access device or a remote access card in an NT server? **PAGE 60.**

REVIEW: Ease the pain of intermittent NT upgrades with Gravity Storm's Service Pack Manager. Page 66.

FEATURE: When bad things happen to good products. A fond look back at those technological wonders that lost out in the marketplace. Page 69.

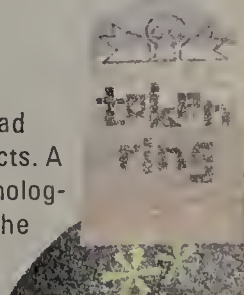

ILLUSTRATION BY PHILIP ANDERSON

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THIS WEEK ONLINE

The gates are open. We've shut off our registration system to make it easier to use Network World Fusion. New visitors can access what they need without filling out registration forms; regular users won't have to remember passwords. Let us know what you think.

Keeping Current. Remember Live Aid? Last weekend, Akamai and Cisco joined with other companies to broadcast NetAid. Performers such as Sting, David Bowie, Sheryl Crow and the Counting Crows were scheduled to perform a virtual concert in New York, London and Geneva. The Webcast and NetAid were developed to raise money to end world hunger. Find out how the 'Net fundraiser fared. **DocFinder: 5032**

Water Cooler. In the past few months, Network World Fusion has made a concerted effort to bring you more daily news. Each day, we send out a newsletter, written by Executive Editor of News Doug Barney, that outlines what's happening in the network industry. Read Barney's take on how it's going, and then send him your comments. **DocFinder: 5034**

The Internet at 30. Readers had mixed responses to last month's feature. Some say they're wide open for change, others say it won't be that much different. "Face-to-face contact won't go away. Engineers and managers are still going to go to Comdex or its equivalent whether it's in Vegas or on Venus," one reader says. Your comments? **DocFinder: 5035**

Intrusion detection. Intrusion-detection systems can disable attackers before they do damage, and we found Network ICE was the best system. Read our review, do some comparison shopping with our Buyer's Guide and then jump into our forum with your comments. Also, check out our feature on how to prevent hacking, and find out what one user is doing to keep his network safe. **DocFinder: 4926**

NEWS BRIEFS, OCTOBER 11, 1999

Another cell phone safety hang-up

Want to bet the lawyers are behind this one? Last week, BP Amoco announced that it will ban the use of cellular telephones at the company's gas pumps in the U.S. over worries that electronic impulses from the devices could start a fire. No, there haven't been any such fires reported — anywhere — and even the theoretical risk is considered exceedingly small. However, BP has apparently decided it's better to be safe than blown to bits. The practice is catching on, too, as Chevron plans a similar measure and the city of Cicero, Ill., enacted its own such ban recently.

AT&T loses cable chief

AT&T's cable chief, Leo Hindery, abruptly resigned last week, leaving the company's risky cable telephony and Internet strategy back in the hands of AT&T veterans rather than cable veterans such as Hindery. AT&T says its cable conversion program remains on track, but it continues to threats to withhold high-speed cable-modem service anywhere that local governments try to force AT&T to open its network to any and all ISPs (see story, page 32).

Bell Atlantic, 3Com team on DSL

Trying to push high-speed digital subscriber line technology to a mass market, Bell Atlantic and 3Com have hit on an idea they're informally calling "DSL in a box."

The companies will offer a low-cost kit designed to give consumers everything they need to get hooked up to the Internet through DSL. The package, called asymmetric DSL (ADSL) Home Connection Kit, will be available in CompUSA and Staples retail outlets throughout the Bell Atlantic region by the end of the month, priced at $229. Until Jan. 31, 2000, buyers can get a $130 rebate, effectively dropping the price to $99. The kit consists of a 3Com HomeConnect ADSL modem; software needed to use Bell Atlantic.net Internet access service; instructions on how to set up the modem and software; and various adapters that let users talk on the phone and access the Internet simultaneously via a single phone jack.

Online travel agencies merge

Two of the leading online travel agencies, Preview Travel and Sabre Holdings' Travelocity.com, last week agreed to merge under the Travelocity name. This will pit the merged online travel firm against the current leader in the market, Microsoft's Expedia. Online travel bookings are expected to reach $4.2 billion this year, according to research firm Jupiter Communications.

VASCO locks up IntelliSoft

VASCO Data Security International last week announced it has acquired IntelliSoft, a privately held company in Acton, Mass., for an undisclosed sum. IntelliSoft makes Secure Single Sign-On and Web authorization products that will be added to VASCO's security line.

FCC blesses SBC/Ameritech deal

The proposed merger of MCI WorldCom and Sprint wasn't the only news on the carrier front last week. SBC Communications, the acquisitive regional Bell operating company, won final federal approval for its takeover of Ameritech after a 17-month battle. The OK comes with numerous conditions, such as the requirement that SBC unify and improve its back-office ordering systems for local competitors and another that SBC enter 30 out-of-region markets in the next three years. William Kennard, chairman of the Federal Communications Commission, lauded the conditions as finally forcing the RBOCs to compete against one another in business and residential markets. Critics charge that the conditions are toothless and say users outside SBC's territory — now encompassing Pacific Bell, Southwestern Bell, Ameritech and Connecticut's Southern New England Telephone — shouldn't hold their breath waiting for SBC to build out new local networks.

FCC chief Kennard says RBOCs will now have to compete against one another.

More Windows 2000 beta coming

Release Candidate 3 of Microsoft's Windows 2000 will ship later this month, company officials said last week. RC3 will be sent to a subset of the 650,000 beta testers who received RC2 in September and will be used to test for recall-class bugs. The release to manufacturing date of Windows 2000 is still scheduled for year-end.

Microsoft last week also released Beta 2 of its Directory Synchronization Services, which finally provides bidirectional synchronization between Active Directory and Novell Directory Services. Microsoft also is making available technology it acquired when it bought metadirectory vendor Zoomit in July.

Intel snaps up IPivot

Acquisition bolsters Internet portfolio.

BY DENI CONNOR

SANTA CLARA, CALIF. — Intel last week announced that it would spend $500 million to acquire IPivot, a company whose Web traffic acceleration and load-balancing products should bolster Intel's growing Internet product and service business.

Intel has been aggressively building its Internet business this year, turning heads with its own Web-hosting business and snapping up electronic commerce technology vendor iCat.

Plans unknown

It's still unclear what Intel's exact long-term plans are for IPivot's products, which off-load e-commerce authentication chores from Web servers and balance traffic loads at Web sites.

In the short term, Intel plans to pitch the products to ISPs and sell them to enterprises via OEM partners.

It would seem likely that Intel could use the technology at its new Web-hosting data centers and perhaps combine IPivot technology with other acquired technology, such as Shiva's virtual private network offerings. But company officials say it is too soon to divulge such plans.

The acquisition of IPivot, as well as Intel's other Internet-related moves, represent an expansion of the company's network strategy. Intel has spent some $4 billion this year on a variety of network-related firms (see graphic).

Intel's network investments

Over the past year, Intel has expanded its portfolio of network component and equipment manufacturers.

Oct. '99	IPivot
Sept. '99	Telecom Components Division of Stanford Telecommunications and NetBoost
Aug. '99	Level One Communications
July '99	Dialogic and Softcom
May '99	XLNT
March '99	Shiva

Early efforts

The company focused its early network efforts on traditional enterprise network gear, largely for small and midsize businesses. The company now offers network gear from adapters and hubs to switches and Web site load balancers, as well as a host of component-level products.

A big part of Intel's network strategy is to help companies build high-speed networks that support computers requiring faster and faster Intel processors, says Craig Johnson of the PITA Group in Portland, Ore.

"Intel is doing the same as it has always done — expanding its networking, communications and services business," Johnson says. "With the IPivot acquisition, Intel wants to drive up the bandwidth, availability and services it offers so people will buy more Intel products."

While Intel's network business has grown quickly in the past few years, it still accounts for less than 10% of the company's revenue.

IPivot, based in Poway, Calif., was founded in 1997 and has 100 employees. ◩

Be a

Net Know-It-All

For the answer to this week's question and more net trivia, visit Network World Fusion and enter 2467 in the DocFinder box.

This week's question:

IsoEthernet, also known as 802.9a, emerged several years ago as a combination of Ethernet and what other technology?

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Novell unveils 'digitalme' adjunct to NDS

Consumer tool just the start of Novell e-commerce plan that exploits company's directories.

BY DENI CONNOR

NEW YORK — Novell is one step closer to making its directory an important cog in electronic commerce, experts say, following the release last week of digitalme, a tool for managing personal information on the Internet.

Based on Novell Directory Services (NDS), digitalme enables customers to do Internet business by using an electronic "wallet" containing personal and financial information. The information in the wallet may be used to automatically enter passwords and access codes, and to fill out Web forms that ask for personal information.

For instance, users may create "meCards" that are stored in an online directory and let them automatically purchase music online. When a user visits a site that uses digitalme technology, the forms on the site automatically read the meCard and are filled in based on instructions the vendor has created.

Novell is also targeting ISPs, application service providers, portals and retailers as digitalme customers. The company will freely distribute the source code and make application program interfaces available to businesses that want to develop digitalme programs.

Novell is intent on building a base of consumers who will want to use digitalme and who will trust the service with their personal information.

"We would definitely use digitalme if it protected our customer information and saved us time doing business on the Internet," says Steve Garms, vice president of Visual Click Software in Austin, Texas. "It would definitely be useful on our Web site, since forms would be filled out correctly and quickly."

The next step in Novell's e-commerce plan, called Ichain, involves building a framework of trusted and secure software so that large companies will be comfortable transacting business online, says Dave Shirk, vice president of product development at Novell.

One piece of Novell's upcoming e-commerce initiative, dubbed the Novell Certificate Server, will allow net managers to freely mint digital certificates for use in sending and receiving digitally signed and encrypted e-mail and for enabling Secure Sockets Layer communications. Certificate Server is in beta and will ship with NetWare 5.1, sources say.

Ichain will let midsize and large businesses transact business over the Internet with their customers, suppliers, resellers and distributors. Novell will provide services that administer the trust and security relationships that must be built, as well as the different directories, databases and applications. These services will include the ability to customize digitalme. Novell will announce Ichain in November.

The e-commerce package also will include Novell's Net Publisher, DirXML, and NDS 8.

Net Publisher, which will ship this year, creates and manages Web documents that can be accessed by users who have been authenticated by NDS. Net managers can set security levels that provide access to specific folders, files or parts of the document.

DirXML is Novell software that will help customers link business data for use in e-commerce applications. It will allow information from databases, network devices and software applications to be consolidated and controlled by the individual department that needs the data. DirXML will enter beta tests this quarter and ship early next year.

Compaq, Intel, AOL, VeriSign and White Pine are among the companies supporting digitalme. ◪

Novell's e-commerce initiative

The company's digitalme is just the start of a plan Novell will roll out in November.

digitalme	Provides online directory repository for personal information.
Novell Certificate Server	Provides transaction security and encryption.
DirXML	Gathers data from different applications for use in site.
Net Publisher	Allows users access to forms, depending on security privileges.

E-mail service becomes MIME reader

BY ELLEN MESSMER

PALO ALTO — Electronic commerce service bureau Responsys.com is bolstering its Interact e-mail marketing service by supporting technology that can automatically determine what e-mail reader a recipient uses and ensure that the next message is in their preferred format.

Responsys.com founder Anand Jagannathan touts marketing using e-mail.

Responsys.com can determine the format by sending out e-mail with the marketing information as a Multipurpose Internet Mail Extension (MIME) message in multiple formats, including HTML, text and the format used by America Online's reader. By discovering and tracking the recipient's e-mail reader, the company doing the marketing can tailor the information to technically suit a particular e-mail reader. This is becoming important as marketing information is sent using more elaborate graphics.

Responsys.com will unveil the capability at the Internet Commerce Expo conference in San Francisco this month.

"The idea is that you can build up information about your customer base, such as whether they can read a rich HTML message," says Atri Chatterjee, vice president of marketing at Responsys.com. This type of HTML message, which can be filled with rich graphics, is starting to find the most appeal among online users, Chatterjee asserts.

Responsys.com is a 1½-year-old company launched by partners Raghu Raghavan and Anand Jagannathan, who also founded Banyan Systems. The e-mail service bureau operates as an application service provider (ASP), letting each of its corporate customers access the Responsys.com direct-marketing application using a URL.

Responsys.com customers include Lands' End, Giga Information Group, Corel, VeriSign, Network Associates, eBay, Virgin.com and PCorder.com.

Responsys.com emphasizes that the firm is a "permission-based marketing service" on the 'Net. This means the company won't conduct a customer's spam campaign.

"With permission marketing where people have opted in, you can send personalized newsletters, renewal notifications, notices about sales and so forth," says Jagannathan. "You can tell them about seminars or remind them that the download they made of your software requires them to pay for it if they wish to continue to use it."

Companies pay $2,000 per month to access the Responsys.com Interact application to send out up to 20,000 mailings. The Responsys.com application runs on Solaris, Linux or NT, and uses an Oracle or SQL Server 7.0 back-end database. ◪

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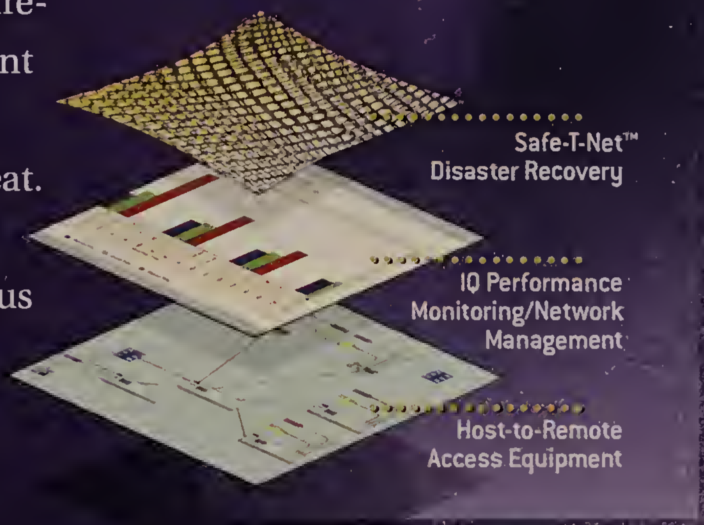

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Exchange users face long upgrade road ahead

Microsoft's next-generation messaging system promises great new features — eventually.

BY JOHN FONTANA

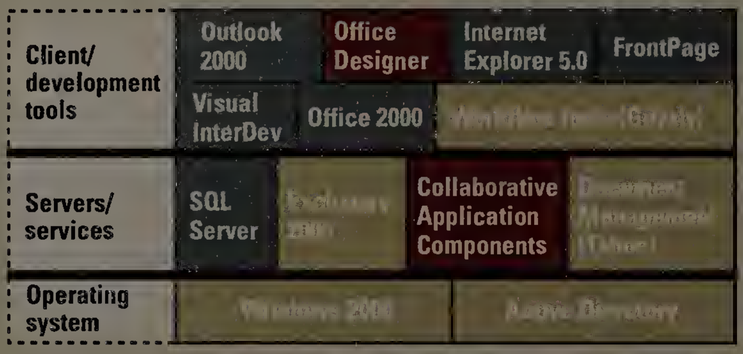
ATLANTA — Now that enterprise customers have the first public beta of Exchange 2000, they know the sobering reality of upgrading to Microsoft's next-generation messaging system.

At the Exchange Conference '99, users expressed excitement over Exchange 2000, especially unified administration under Windows 2000 Active Directory and universal access to the new Exchange storage system, dubbed the Web Store.

But their excitement was tempered by the realization that moving to Exchange will be a complicated process. It will involve an upgrade to Windows 2000, integration of Exchange with the new operating system, and migration to Active Directory, a key component of the operating system and the messaging product. The migration process will force IT staffers with different areas of expertise — messaging, security, operating systems and directories — to work together like they never have before.

Collaboration Building Blocks

Microsoft is trying to create a platform for collaboration out of a variety of building blocks. The company has established Exchange 2000 and its Web Store as a cornerstone but has yet to articulate how the rest of the platform fits together.



■ Released ▭ Unreleased ■ Under development

"We have security personnel who do user-account creation, and they are not well-versed in Exchange, but with Exchange 2000 everything they do will have a direct effect on us," says David Ellis, senior technical analyst for Carlson Companies, a Minneapolis-based travel, hospitality and marketing firm.

"It makes no sense having someone deploy Windows 2000 and then have me come in and do Exchange 2000. We have to work together," says Terri Harrison, a network analyst for law firm Baker & Hostetler in Cleveland.

"Integration is a big issue, and administrators will have to understand how to work together," says Gytis Barzdukas, lead product manager for Exchange.

Active Directory is at the center of the migration process.

"If you don't get Active Directory right, you will get to the point where Exchange will not work," says Tony Redmond, director of the Applied Microsoft Technologies Group at Compaq. Microsoft advises detailed planning.

"We have 15 people studying Exchange 2000 issues," says Don Snively, a network architect for the State of New York Human Services Application Service Center. "We have to rethink our whole topology and replace a lot of our hardware."

Those issues will keep administrators busy, and that should give Microsoft time to complete work on assorted Exchange collaboration tools. These include document management services, yet-to-be-announced server application components and an application design tool.

The design tool, dubbed Office Designer, is much like Lotus Notes Designer for building applications, say sources within Microsoft. But the real jewels will be the set of collaborative application components that Microsoft sneak-previewed in Atlanta. The components can be stored in the Exchange Web Store or any other object store, including Notes.

Microsoft also must deliver Tahoe, a set of document management services, and Grizzly, a set of workflow tools. Microsoft has not produced a Tahoe beta; Grizzly should ship this year.

"It's clear Microsoft has not figured out how to position itself in the collaboration space," says Tom Austin, a Gartner Group analyst. "If they had, they would have had a clear, resounding message at this conference — and they didn't." ◩

IBM boosts management, performance features of front-end processors

BY MARC SONGINI

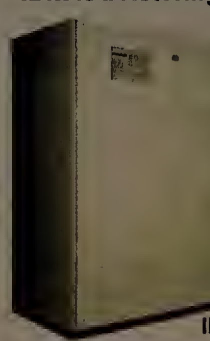
RESEARCH TRIANGLE PARK, N.C. — IBM is looking to improve management and connectivity options for its 3746 communications controller users.

Next month, the company's Networking Hardware Division (NHD) will announce software improvements to its 3746 family of controllers, also called front-end processors (FEP). They include changes in the 3746 that will help customers using Advanced Peer-to-Peer Networking and High Performance Routing (HPR) manage their nets more efficiently, as well as speed up mainframe access for IP users. HPR, the latest version of APPN, allows SNA traffic to take on IP-like qualities, such as dynamic routing failover.

Worldwide, there are about 38,000 SNA controllers like the 3746 installed in mainframe nets, according to International Data Corp., a consultancy in Framingham, Mass. IBM claims it has about 95% of that market.

Front-end processor enhancements

IBM is bolstering the 3746 to include:



- Improved Advanced Peer-to-Peer and High Performance Routing management support.
- Better CPU and memory utilization management.
- Support for OSPF for IP routing.

IBM's 3746

To ease management headaches, IBM will now enable NetView for OS/390 to handle APPN-HPR networks controlled by the 3746. NetView is IBM's mainframe-based network management software program. Previously, users had to rely on an interface on the 3746's management console, which didn't work with NetView, says Gilles Garcia, an IBM executive. IT staff using the service console will be able to monitor cycles and memory utilization rates on the 3746. Customers can program the 3746 to alert them if preset thresholds are exceeded.

Also on tap: a 20% boost in IP routing performance for the 3746, says Garcia. IBM will do this by supporting the Open Shortest Path First (OSPF) routing protocol on the 3746 when running IP traffic over a mainframe's Enterprise Systems Connection (ESCON). Previously, the 3746 used the Routing Information Protocol (RIP) to run IP over the ESCON channel, requiring the conversion of any OSPF traffic to RIP format, which slowed performance.

To further speed up the 3746, IBM will enable it to regularly update its APPN-HPR network topology map and discard outdated information, such as network nodes that have been moved or replaced. The topology data is saved to disk in case of a shutdown or crash. When rebooted, the 3746 will refer back to the image on the disk, and not have to go through the time-consuming process of rediscovering the entire network.

The 3746 upgrades are available now. Pricing starts at $3,000. ◩

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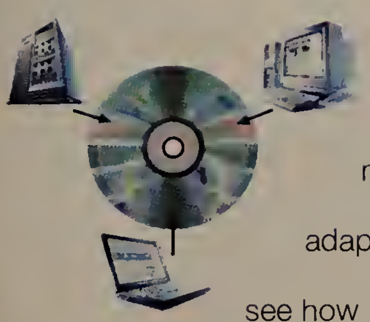

You probably don't view adapters as mission-critical. But if that's what they're taking time from, maybe you should. Now there's a way to take that time back. Intel® Single Driver Technology lets you control your Intel Fast Ethernet connections as one. So set-up and maintenance are simplified. Yet another reason why leading manufacturers offer Intel adapters in their PCs, notebooks and servers—and why network professionals are asking for them. Visit our Web site today and see how Intel Single Driver Technology can give you more quality time with your network. → *intel.com/network/appreciate*

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Video vendors air their wares at Internet World

BY CAROLYN DUFFY MARSAN

NEW YORK — Four years after a government-funded group conducted the first Webcast over the Internet, the types of video streaming products on display at Fall Internet World '99 are not yet widely deployed in the enterprise.

However, those hot on the technology insist it's only a matter of time.

Internet World featured many developments in video streaming, including new tools for converting existing video into Web formats; systems that support full-screen, TV-quality video; and services for speeding up video transmission over the Internet.

"It's happening in a few companies, but it's not going to happen on a large-scale basis until it's a turnkey solution," says Karen Anderson of encoding.com, a Seattle-based company that converts video content to Web formats. "Fortune 500 companies have lots of video assets, like old commercials, that can be put in Web formats and managed from a database."

Sonic Foundry of Madison, Wis., displayed its new Stream Anywhere desktop software, which encodes multimedia content from videos or CDs for display over the Web. Stream Anywhere costs $199 and supports competing streaming video formats from Microsoft and RealNetworks. The user interface features a visual timeline, and separate audio and video tracks to help users synchronize information and apply identifying tags. Once created, the streaming video can be exported to Microsoft's Front Page for inclusion in a Web page.

"Stream Anywhere adds interactivity to a Web site," says Keith Bieneman, marketing product manager for Sonic Foundry. "It's ideal for intranets." For now, he says, corporate use is limited mainly to adding video to Web sites.

SightPath, a Waltham, Mass., start-up, demonstrated its method for sending full-screen, TV-quality video over intranets. SightPath provides server software called Studio that stores Web-enabled video at a central location and replicates it onto a SightPath hardware/software appliance at a remote site. The devices handle the streaming video without slowing down the WAN or LAN, SightPath claims. End users simply click on a URL to view a video. SightPath officials say 50 companies are testing the 6-month-old system.

Meanwhile, Akamai Technologies of Cambridge, Mass., announced a new service for delivering streaming media over the Internet. Free Flow Streaming is designed for Webcasting live and on-demand events over the Internet rather than in private intranets. Akamai officials say end users will not experience packet loss, since Free Flow Streaming sends four streams of traffic over the Internet for redundancy. Akamai has a network of 1,200 Internet servers that push content close to end users to improve Web site performance. ◪

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ADC

MCI WorldCom,
continued from page 1

Internet backbones. One criticism being raised is that the MCI WorldCom/Sprint combo will tighten up contract terms and become stingier about negotiating lower prices because there won't be two firms competing against each other anymore.

"What we're concerned about is that it's going to mean we can't [pit] them against one another," says George Sullivan, senior network architect at Northrop Grumman in Bethpage, N.Y. Sullivan uses MCI WorldCom packet data services, and Sprint voice and private lines. Sullivan says he fears a repeat of a recent changeover of MCI WorldCom account teams "which didn't go as smoothly as it should have."

"I don't see what it's going to gain for us," agrees George Hallenbeck, until recently the telecommunications director at Marsh & McLennan and now an independent consultant writing requests for proposal for other users. "I need to see these two companies supplying their basic core services independently. I need to have an alternative source of supply."

Some MCI WorldCom customers were enraged that, in their view, MCI WorldCom CEO Bernard Ebbers had again turned his attention to a megamerger rather than customer service.

"In my opinion, they can't deal with the networks they have. I can't imagine what will happen with a new one," says Mark Collins, manager of network services and telecommunications for Bunzl USA, a plastics distributor in St. Louis.

For their part, Sprint customers said they feared a rerun of billing and customer service problems that resulted after WorldCom swallowed MCI. "This merger really gets my goat," said one in an e-mail to *Network World*. Said another who also asked not to be identified: "What I think about this deal is unprintable."

And Network World Fusion's forum on the merger crackled with denunciations of Ebbers for corralling Sprint. "Will someone please take away Bernie's checkbook?" pleaded one network professional who said he has worked at various companies and always migrated them to Sprint.

Unlike WorldCom's 1997 acquisition of MCI — which brought together WorldCom's UUNET unit and more than 100 local fiber networks with MCI's long-distance prowess — the reasons for this deal seemed to have little to do with enterprise networking.

The merger does give MCI WorldCom one of the nation's top consumer wireless networks — Sprint PCS, which covers 280 local markets around the country. Ebbers also extolled Sprint's recent heavy investment in licenses for the wireless Multimedia Distribution Service. That potentially gives the company a way to bypass Bell company local loops to reach homes for voice and data traffic, just as AT&T is trying much the same thing for residential users located away from its cable plant.

But on the business-services side, the deal seemed to catch Sprint flat-footed. Officials of both merging companies made little effort to hide the fact that they hadn't even begun to discuss how to sort out their fast-packet and IP networks. A Sprint spokeswoman said that even Sprint Chief Technical Officer Marty Kaplan couldn't shed much light on the merger: "I'm pretty much certain he hasn't had the opportunity to talk to anyone at MCI about their plans on this," the spokeswoman said.

Some experts labeled the merger nothing more than a brazen play to restore disappearing profit margins in the long-distance business — which for consumer calls are now little more than a penny per minute after MCI WorldCom or Sprint pays the Bell-company access charges on both ends of a 5-cent call.

Now MCI WorldCom will have more freedom to set prices without seriously reacting to any competitor other than AT&T, says Frank Dzubeck, president of Communications Network Architects, a consulting firm in Washington, D.C. MCI WorldCom wants to buy Sprint simply because Sprint's pioneering consumer offers "were forcing everybody to be honest," he says. "But any textbook that you go to will say you can't do this."

For new deals with large enterprise nets, Sprint is pricing even lower than the 4- to 5-cent deals now becoming common industrywide — as low as 3 cents per minute with a dedicated access line, Dzubeck says. And Sprint has been more flexible on liability, termination and other contract clauses than MCI WorldCom, says Hank Levine, a Washington, D.C., attorney who negotiates user contracts. Both Dzubeck and Levine fear that such attractive deals may be harder to get if the merger goes through.

So you're my dance partner

Top MCI WorldCom and Sprint officials say the combination of their companies will enhance their ability to bundle services for consumers and businesses. And the deal would give Sprint the big-city fiber rings in the U.S. and overseas it has lacked. Such rings strengthen a carrier's ability to offer end-to-end services.

But some users said a better idea would have been for Sprint to ally with BellSouth, which made a losing bid for Sprint. That's because even carriers such as MCI WorldCom and AT&T, which have local fiber rings, don't cover nearly as many locations as the Bells do. "If anything, the [long-distance] carriers seem to be losing the cooperation of the local exchanges," says Northrop Grumman's Sullivan, pointing out that many of his manufacturing facilities are located far from city centers.

Regulators and even Sprint employees were reported to be feeling the same way. "[Sprint employees] were hoping to become the long-distance division of someone else," Levine says. "They would have held more of the cards in that situation. Now the MCI WorldCom people are smiling and waiting. They're survivors of this jungle. And the Sprint people are going, 'Oh, damn.' "

Sprint officials admitted the mood inside their company was tense. "I can't say that everyone is totally accepted and comfortable with it," says Peggy Arnone, product manager for Sprint's highly respected frame relay class-of-service offering.

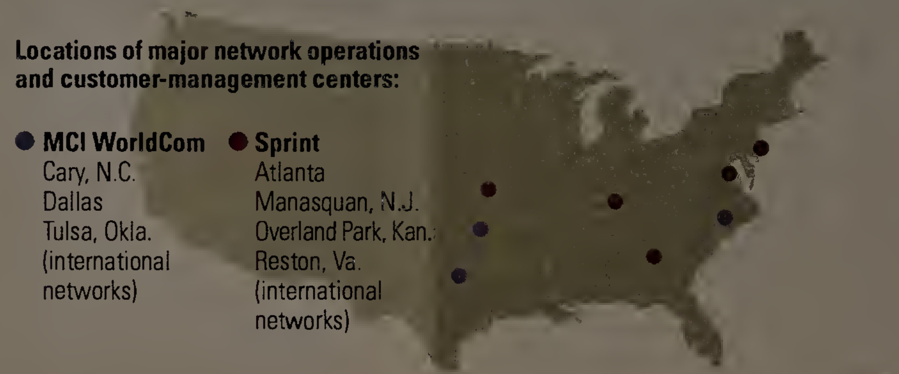
Arnone has directed the recent, ultra-quiet rollout of Sprint's voice over frame relay service as another convergence alternative to Sprint's ATM-based Integrated On-Demand Network (see story, page 16).

MCI WorldCom said Sprint would get six board seats and MCI WorldCom would get 10, and Sprint CEO William Esrey would become the combined company's chairman. But that's a move long-time WorldCom watchers labeled an old tactic to ease a CEO of an acquired company — like competitive local carrier MFS or MCI — out of the picture.

See **MCI WorldCom**, page 16

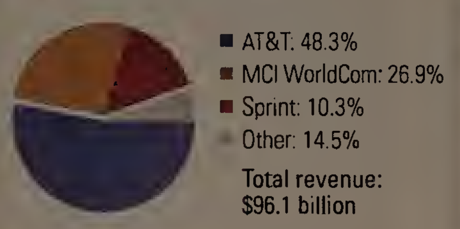
A whole lotta duplication

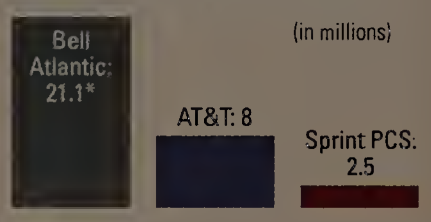
MCI WorldCom's and Sprint's local and wireless networks generally don't overlap, but when it comes to frame relay, the firms have many assets to sort out.


Locations of major network operations and customer-management centers:

WorldCom's WAN power

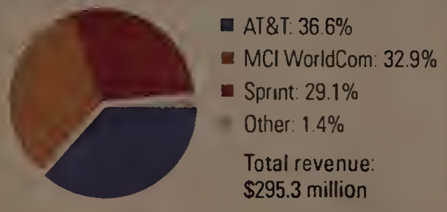
Although the deal will not make WorldCom the largest long-distance carrier or wireless services provider in the country . . .

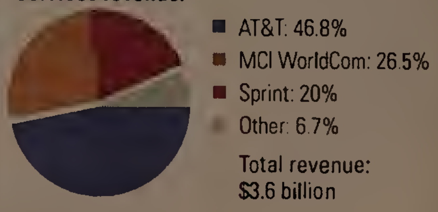

1998 long-distance revenue


Current wireless services subscribers

*Includes subscribers from recent mergers with GTE and Vodafone Airtouch.

. . . the new company will dominate the ATM services market and go toe-to-toe with AT&T for the lead in providing frame relay services.


1998 national/international ATM services revenue:


1998 national/international frame relay services revenue:

SOURCES IDC FRAMINGHAM, MASS MCI WORLDCOM, SPRINT

MCI WORLDCOM

- **Long-distance points of presence:** 400
- **Internet POPs:** 1,000
- **Local presence:** 103 metropolitan areas
- **Wireless presence:** None
- **Network platforms:** Frame relay: Nortel BNX, Lucent 500 and 9000, and General DataComm switches. Legacy CompuServe network.
  ATM: Newbridge and Cisco BPX switches
  Internet: Juniper M40, Cisco, Lucent/Ascent switches and Nortel Networks routers.
- **OC-48 transport.**

SPRINT

- **Long-distance points of presence:** 348
- **Internet POPs:** 500
- **Local presence:** Smaller second-tier cities in 18 states.
- **Wireless presence:** 280 markets in all 50 states, Puerto Rico and the U.S. Virgin Islands.
- **Network platforms:** Frame relay: Alcatel and Nortel Passport switches
  ATM: NEC core switches and Nortel Vector edge switches
  Internet: Cisco 12000 GSR.
- **OC-3 to OC-48 transport.**

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MCI WorldCom,
continued from page 14

Big deal

The MCI WorldCom/Sprint merger not only tops all other recent telecom megamergers, but also is the largest corporate merger of all time.

Top five corporate mergers

Acquired	Acquired by	Date	Value (in billions)
Sprint	MCI WorldCom	Oct. 1999	$115
Mobil	Exxon	Dec. 1998	$77.2
AirTouch Communications	Vodafone	July 1999	$62.7
Ameritech	SBC	May 1998	$61.3
Amoco	British Petroleum	Dec. 1998	$56.4

SOURCE: MERGERSTAT, THE ASSOCIATED PRESS

If the Federal Communications Commission and the European Union approve the merger, they are widely expected to require the combined company to sell off Sprint's Internet backbone, which scales from OC-3 to OC-48 among 15 top U.S. cities. But few analysts believe that's the only thing MCI WorldCom will eliminate. Sprint has incumbent local telephone networks in 18 states, mostly in smaller towns. "[Ebbers] doesn't want that, with all the state regulatory problems. He's going to sell it off, too," says Dzubeck.

Levine goes further, predicting a sale of Sprint's regular long-distance network as well. "He doesn't need Sprint's points of presence, and he does not need Sprint's fiber," says Levine. "He just wants the customers."

By contrast, the companies' total of six frame relay networks — four at MCI WorldCom, two at Sprint — may be retained. MCI WorldCom officials, having shelved an integration program as a result of the carrier's recent frame relay outage, have held out the possibility of offering users one network as a backup to another in a package.

"Anytime you migrate and merge, you're just asking for trouble," says Cathy Gadecki, a TeleChoice analyst. But Gadecki is skeptical the two companies can position one network as a backup to the other.

"You need to be connected to different software stacks, which means you need to be connected to two different switches," Gadecki says. "It's a nice marketing story, but I don't think it's terribly real."

As an alternative, MCI WorldCom and Sprint are likely to point to some common vendors as an argument that they can integrate their networks. But that argument won't wash, say experts, because those vendors are themselves largely the product of mergers.

For example, the legacy MCI frame relay network and the newer of Sprint's two frame networks are both based on Nortel Networks gear. But the equipment comes from the two different halves of Nortel: the MCI net consists of Bay Networks routers, and the Sprint net is based on Passport ATM switches from the original Nortel.

"The fact that they're under the same roof doesn't guarantee any more compatibility between the two networks," says Stephen Von Rump, a former MCI WorldCom data services marketing chief and now chief operating officer at videoconferencing vendor VTEL.

Another concern for users is that staff levels at the new WorldCom would likely drop, despite Ebbers' protests that the merger would provide new growth opportunities for employees. "You've got so much overlap here it's ridiculous," Dzubeck says.

At MCI, "the only people who have stayed are the lifers," says Deb Mielke, a former internetMCI and MCI Systemhouse official who now runs a Dallas consulting firm. She predicts a massive outflow of Sprint executives.

That prospect frightens some users. "MCI WorldCom staff levels are so low that we are constantly fighting to get jobs accomplished," Bunzl's Collins says. "I constantly have orders that are wrong or haven't even been placed weeks after the request was made. The technical understanding of the network doesn't exist; I have even had their people cutting each other down and admitting that they have no idea what is going on with the network."

Mort Rahimi, vice president of telecommunications at Northwestern University, says that if the field of dominant long-distance carriers is reduced to two, it may be time to unleash the regional Bell operating companies on the long-distance market to ensure continued competition. "We don't want to get back to the days of Ma Bell, with only one provider," he says.

For others, the merger would create unique problems. For example, the federal government's current comprehensive telecommunications contract, called FTS 2001, has two vendors: MCI WorldCom and Sprint. If the merger closes, it would violate a 1980s congressional mandate against dealing with one telecom vendor, Dzubeck says.

"The General Services Administration can't let this occur," he says. "They're going to have to basically go back and recompete [the contract]."

Senior Editor Tim Greene contributed to this story.

Paper chairman?

Esrey will become chairman of the board of WorldCom, while Ebbers becomes president and CEO. But should Esrey be worried? Former MCI CEO Bert Roberts and MFS CEO James Crowe both became chairmen when WorldCom bought their companies, only to disappear within a year after their mergers.

See what the experts think: Go to pages 88 and 89 for four industry watchers' views of the proposed deal.

WHAT IS SPRINT ION'S FATE?

For nearly a year and a half, Sprint has practically wrapped its entire public identity around the concept of the Integrated On-Demand Network. ION is an ATM-based convergence service based on specialized carrier-managed customer premises equipment and a single broadband access line for voice and data. Sprint CEO William Esrey touts ION everywhere he goes.

But the service has been slow to roll out and has had little effect on the market. And although for now MCI WorldCom officials say they'll find a role for ION in the merged company, analysts are debating what the firm will really do with it.

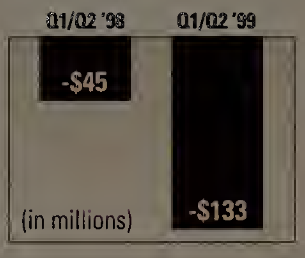
"It was an interesting marketing ploy for 18 months," says Frank Dzubeck, president of Communications Network Architects, a consulting firm in Washington, D.C. "I don't see MCI following through on it."

Sprint has to build separate points of presence for ION, he says, making it an expensive proposition for the carrier; one that has already lost a fair amount of money (see graphic).

On the chopping block?

Some observers say Sprint's unprofitable ION business segment is not likely to survive the buyout by MCI WorldCom.

Sprint's ION business losses



SOURCE: SPRINT'S SEC FILINGS

TeleChoice broadband analyst Cathy Gadecki agrees. An ATM-based convergence service can help enterprises save money on their internal networks, she says: "But the world has moved on from that."

Many of the same companies that could have bought ION, she says, are now fired up by the prospect of using telecommunications to make, rather than save, money — and that means an IP-based extranet for electronic commerce.

However, Giga Information Group telecom analyst Lisa Pierce says that MCI WorldCom's labs have been working on an ATM-based converged voice/data network similar to ION. So she believes that MCI WorldCom will in fact make ION part of its product portfolio.

But users are also looking for ways to incorporate voice in ordinary frame relay and IP networks, Pierce says. And *Network World* last week confirmed that over the summer, Sprint quietly rolled out a voice over frame relay service to its sales force even while publicly promoting ION.

Under the new service, Sprint places and manages a Cisco 3810 voice-enabled router on the customer premise — or allows the customer to install its own Sprint-certified voice frame relay access device, such as those offered by Nuera or Nortel's Micom division. These devices typically produce 8K bit/sec of compressed voice, and Sprint scales up the committed information rate, or guaranteed bandwidth, on the frame relay circuit to a multiple of 8K bit/sec. Under the service, users can even dial in to a remote PBX over the frame relay network and place local calls in a distant city, cutting out long-distance tolls even on calls outside the enterprise.

That kind of incremental service may be an easier one for users to swallow than a full migration to ION, and even loyal Sprint customers may not cry in their soup if ION doesn't make the merger cut. "The arrangement didn't make sense to us," says George Sullivan of Northrop Grumman, who recently had his Sprint representative in to talk about ION. "If you put all your eggs in one basket and you have a single access line, what happens if it breaks? You can't leave a voice mail to say your e-mail is down, and you can't leave an e-mail to say your voice is down."

— David Rohde

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SPECIAL REPORT PART ONE

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data storage
without slowing
down your
network

PLUS: SAN implementation challenges

Managing the data mountain

ILLUSTRATIONS BY STUART BRADFORD

SANs provide fast and limitless storage for the enterprise without impeding bandwidth

By Eric Hammond

If you have spent any time thinking about storage, odds are, you have thought about storage-area networks (SANs) recently. SANs are rising in prominence as more shops look to them to solve storage problems and more vendors jump on the bandwagon. But what is a SAN and what can it do for you?

According to International Data Corp. (IDC) research, SANs and the Fibre Channel technology that connects them will become the preferred storage solution in enterprise data centers. Further, Fibre Channel-based storage revenue will hit $15 billion by 2002, according to IDC reports. These numbers cannot be ignored.

Clearly, there is some substance behind this craze. Several factors help make the SAN so attractive to the enterprise: performance, reliability and ease of management. A SAN functions like a specialized network within the enterprise and allows unrestricted information exchange between hosts and storage devices, which can bring substantial storage relief.

Storage is perhaps the supreme dilemma of distributed computing. In the rush to empower the end-user by decentralizing computing resources, IT managers lost control over storage. This may seem like the goal of distributed computing — putting data in the hands of those who use it — but that is not the case. In fact, the goal is to give users more

▹ **CONTINUED ON** *page S7*

e-business
BEFORE THEY CAN
ORDER
THE GOODS
IBM

FYI The supermarket chain meets the supply chain. On the Web, access to timely information helps suppliers keep products in stock, inventories low and customers returning.

FYI Company employees can quickly
over an intranet to determine who's

ON THE WEB, EVERYTHING STARTS WITH INFORMATION. EVEN IN A SUPERMARKET. FROM e-SHOPPERS PLACING ORDERS ONLINE TO e-SUPPLIERS FILLING THEM. YOUR CHALLENGE: KEEP INFORMATION WITHIN REACH OF PEOPLE WHO NEED IT.

IBM ENTERPRISE SAN

A MORE RELIABLE WAY TO MANAGE e-BUSINESS INFORMATION.

Without a doubt, the success of your e-business relies on greater numbers of people being able to access even greater amounts of information. Whenever and wherever they need it. Keep even one person waiting, and business may go elsewhere.

It's your job to make sure that doesn't happen.

The challenges are many. For instance, as more of your business continues to migrate to the Web, the demand for information will touch everything from e-commerce to supply chain management to business intelligence to customer relationship management.

You will have to more efficiently manage the ever-increasing amounts of information that e-business requires – information that can grow by 800 percent every year.

You will have to provide customers, employees and suppliers with round-the-clock access to timely information on a variety of platforms – even during peak traffic periods. And, should any data accidentally be deleted or derailed, you will have to be able to recover it quickly – before any business is lost.

THEY HAV
ACCESS
THE INFO

How you store, manage and protect this valuable resource can be the difference between closing a sale and a closed door.

SEPARATE THE STORAGE FROM THE STORE. If your company is like most, crucial information is spread across a variety of task-oriented servers. These one-to-one server and storage relationships are neither practical nor efficient when dealing with huge volumes of e-business data.

An IBM Enterprise Storage Area Network (SAN, for short) takes an entirely new approach. Basically, a SAN is a separate, centrally managed network dedicated to managing information.

ire and analyze up-to-date sales data
ig and what's selling in which locations.

Information on past purchases lets businesses use the Web to personalize promotions,
FYI anticipate future needs and strengthen customer relationships — today.

(Technically, a SAN is a combination of hardware, software and networking devices. It uses high-speed fibre channel technology to connect different types of servers and storage formats in a many-to-many configuration.)

TO

MATION.

Instead of having separate "islands of information," an IBM Enterprise SAN gives you a shared pool of data that can be accessed by everyone.

The benefits are enormous. Consider this: as much as 60 percent of LAN traffic stems from data backup. By moving storage to a SAN, you will free up bandwidth so user requests can be handled more quickly, while data backups can be completed in much less time (a backup that once took 6 hours can now be done in 20 minutes).

You can put new and updated information up on your Web site in one-quarter of the time needed previously. You can easily "plug in" additional storage capacity without taking your systems offline. And you will have a far more cost-efficient and staff-efficient way to manage all your multi-platform and multilocation information.

PEOPLE WHO GET IT. PEOPLE WHO CAN MANAGE IT. Only IBM can offer the complete range of services, hardware, software and technology needed to successfully get your Storage Area Network off the ground.

IBM Global Services has decades of storage experience spanning a variety of industries and platforms, as well as scores of qualified storage consultants on hand. People who can help you transform your current systems into an open and integrated SAN solution – one that is designed to extract the most value from your data.

e-business

What role does your information play in e-commerce, in supply chain management, in business intelligence, or in enterprise resource planning? From early consulting, planning and design through implementation, IBM Global Services will help you align your SAN and business priorities so information flows more freely.

If you're going to do business on the Web, it's imperative that information is consistently available, secure and well-managed. All the time. IBM can help here, too.

Tivoli Systems Inc., a worldwide leader in IT management solutions (and an IBM company), can help you meet the

complex demands of managing a SAN. Tivoli's fully integrated and end-to-end SAN management solutions feature LAN-free backup, archiving and data recovery across virtually all platforms. You get a central view of information across your enterprise, improved data throughput and drastically reduced backup and restore times.

Your users get something, too: access to the information they crave.

The magic box is an IBM @ business server.

Information can magically transform your business into an e-business. Provided that the servers handling your information are accessible, scalable and secure. IBM excels at getting the magic out of the box.

In fact, no one understands e-business better than IBM, because no one knows storage and servers better than IBM. Take our Netfinity® servers. Leveraging years of enterprise experience and cross-platform know-how, a Netfinity server is designed to power your SAN with minimum effort and maximum results. Think of it as a high-availability e-business server at an affordable price – a magic box.

e-business

Where you store information is as important as what's being stored. IBM is a leader in storage technology. Like the IBM Enterprise Storage Server.™ It speeds up access to information across all major platforms – Windows NT,® UNIX,® AS/400,® S/390® and Novell® included. It can be upgraded with additional storage capacity, on the fly. And it provides a foundation for true data sharing – the ultimate magical promise of Storage Area Network technology.

START WITH WHAT YOU HAVE. BUT START. If you're looking to make the transition to a SAN, you don't have to start over. But you do have to start. (We estimate that by the year 2002, roughly 70 percent of medium- and large-sized companies will have implemented a SAN to manage their e-business data.)

IBM can show you how your existing storage systems can be combined with today's leading technologies and innovative thinking to provide your customers, suppliers and employees with fast, secure and reliable access to information.

To find out how IBM can help you design and deploy an IBM Enterprise SAN that will enable your information to keep pace with the endless demands and infinite growth of your e-business, access our information at **www.ibm.com/san**

IBM IS AN IDEAL PARTNER FOR ANY COMPANY LOOKING TO MOVE ITS CRITICAL BUSINESS INFORMATION TO A SAN. HERE'S WHY:

FYI

IBM GLOBAL SERVICES

The 131,000 people of IBM Global Services have the experience and skills to transform your current storage systems into an open, responsive and cost-effective SAN solution.

FYI

IBM SERVERS (A.K.A. *magic box*)

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FYI

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FYI

TIVOLI STORAGE MANAGEMENT

Tivoli provides an integrated, open and end-to-end SAN solution for managing backup, archiving and data recovery from a single location.

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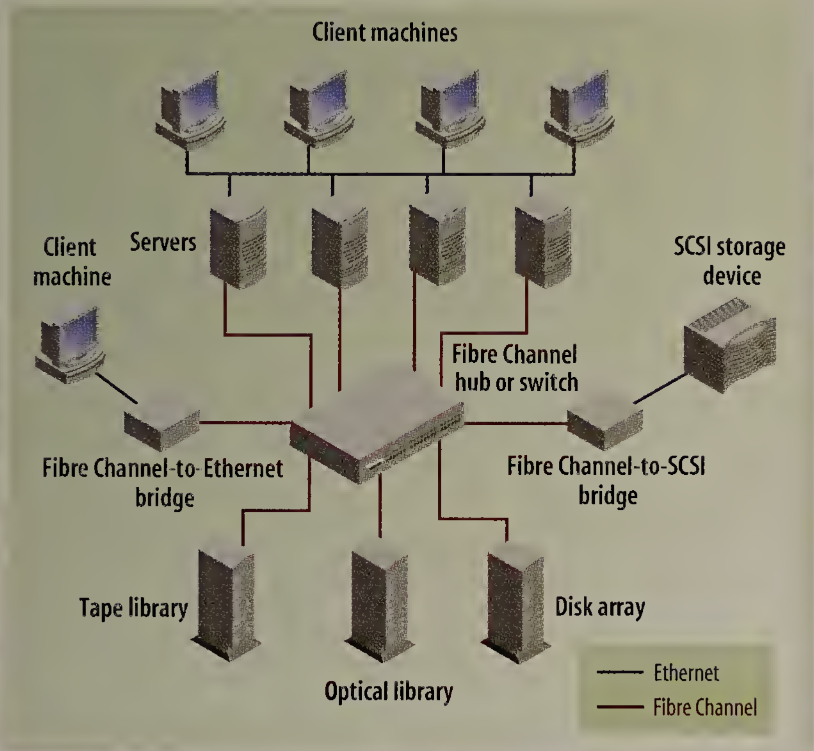
Form and function

A storage-area network architecture looks like a regular network. However, it is designed to allow storage devices to be independent of hosts on the network.



MEGAN ROSTAN/INFOWORLD

control over their environment and the tools they use to turn data into information. There's a big difference between this and decentralized storage of data.

By decentralizing data storage, distributed computing places the responsibility for reliably maintaining data on the shoulders of the folks least able to effectively carry out the task — the typical end-user. Users love the freedom to find new tools and new ways to look at the data stored on their systems. But for the most part, they ignore the responsibility of managing this data.

Data can be found on end-user systems, end-user-managed "servers," workgroup and departmental servers, and the servers on the back end that make up the fabric of enterprise IT. As one can imagine, backups, version control, performance monitoring, and all the other aspects of a good storage strategy take place on these systems in varying degrees — from not at all to nearly always.

It is easy to see what problems may occur. Critical data residing on end-user systems is not backed up or, at best, it is backed up irregularly. Redundant copies of files consume disk space and network bandwidth. Multiple versions of files create reconciliation headaches. Performance issues abound as servers with popular data and applications bog down, while less-used ones rack up idle CPU ticks. This scenario virtually cries out for a centralized approach to storage management that provides fault-tolerant, regularly backed up, high-performance, and flexible storage of the data that fuels enterprises today — something a SAN can provide.

COMING UP

PART TWO
IMPLEMENTATION:
How to add a SAN
Nov. 15

The Web also creates glorious storage problems. The rapid pace of Web application development and deployment consumes infrastructure at an alarming rate. And your Web site may have 30,000 hits today and 300,000 hits tomorrow when the latest update to your software is available, a big news story breaks, or a hot new stock debuts. In this frenzied world, several constants emerge; vast quantities of data need to be instantly and reliably available to servers and applications across the enterprise. Decoupling storage and servers by employing a SAN can alleviate capacity bottlenecks by allowing for dynamic reconfiguration of storage resources and the systems that access them.

These were the problems faced by Norman Mainer, vice president of engineering and chief technology officer at iSearch, a company that specializes in maintaining résumé databases for employers and job-search Web sites, in Los Angeles. With 3 million résumés in dozens of databases and the performance demands of intelligent Web-based search applications, Mainer knew he would face a nightmare if iSearch did not get their storage right the first time. The solution from Storage Technology that iSearch implemented on its Compaq Alpha server farm provides centralized storage for iSearch's databases. The SAN is fault-tolerant, high-performance, and — most importantly — dynamically reconfigurable to meet changing customer needs.

Fitting the pieces together

Let's look at the pieces of a SAN and how they come together to solve problems such as iSearch's. Perhaps the best place to start is to define a SAN: It is a high-speed interconnection that links storage devices and servers in a shared environment. It is, essentially, its own network in which data travels over a SAN independently of the LAN. It completely bypasses any bandwidth conflicts that may arise in the enterprise.

You can't have a discussion about SANs without having a discussion about Fibre Channel, the de facto technology that provides the interconnection for the SAN. One way to look at Fibre Channel is as a cross between a SCSI and Ethernet, only faster and with the potential to span much greater distances.

Like SCSI, Fibre Channel provides a robust connection between storage devices and servers or clients. Like Ethernet, Fibre Channel supports many devices on one network and can support different topologies, including loops and switched environments. Unlike SCSI or 100Mbps Ethernet, Fibre Channel provides extremely fast connections up to 1Gbps, with 4Gbps speeds on the drawing board.

Also unlike our two time-tested friends, Fibre Channel can span 10-kilometer distances and, more commonly, the distances found in campus environments — or up to 45 kilometers via the use of the latest technology. This means that components on a SAN can be distributed more freely than can devices on a SCSI bus, facilitating space, security, and disaster-recovery requirements.

On a Fibre Channel SAN, you might find devices such as Fibre Channel hubs and switches, which provide the kind of functionality that Ethernet hubs and switches provide. You might also find bridges from Fibre Channel to SCSI and Fibre Channel to Ethernet, facilitating the inclusion of more conventional devices on the SAN.

Of course, a SAN without servers and storage devices would not be a SAN. Servers can be attached to a SAN via Fibre Channel host bus adapters (HBAs). If a server does not support a Fibre Channel HBA, it can be attached via a SCSI or Ethernet to Fibre Channel bridges to give it access to the SAN. As with servers, storage devices may or may not be Fibre Channel-enabled, but can be attached to a SAN either way. Major storage vendors offer Fibre Channel-enabled disk drives, disk arrays, optical libraries, and tape libraries. Legacy SCSI devices are not left out in the cold either, as a Fibre Channel-to-SCSI bridge will bring them into the SAN fold.

Of course, a SAN without software would be an expensive furnace. When you get to the

▷ **CONTINUED ON** *page S8*

CONTINUED FROM *page S7*

software piece of the puzzle, you reach the frontier of today's SAN technology (see box, below). The technical foundation provided by SAN hardware and the Fibre Channel interconnection opens the door for amazing storage capabilities, but current software support for the SAN is quite rudimentary.

With today's software, you can expect a SAN to provide servers with access to data stored on SAN-attached disk and tape. You will also be able to make better use of resources, such as tape libraries, by sharing them across multiple servers. Soon, you will have tools to complete backups across a SAN, without the need for a server, and to give network clients better access to SAN resources.

Valuable addition

How do these pieces come together to make a SAN a valuable addition to your storage strategy? Simply put, they provide a reliable, high-performance, dynamically reconfigurable storage architecture. Because of the shared nature of Fibre Channel, devices connected to it are not dependent on a single host as they are with a SCSI.

Disk arrays, for example, can be shared by a number of hosts on the SAN. The number of hosts accessing a given disk resource can be increased or decreased dynamically depending on the capacity requirements of the resource. And tape drives, often the most expensive parts in a storage architecture, can be shared efficiently by a number of hosts without a dedicated tape server.

A SAN provides a truly centralized storage solution. The upside is that centralized storage is easier to manage than distributed storage. Backing up a large disk array is far less painful in a SAN environment than backing up dozens or hundreds of clients and servers in a more traditional environment.

And with the distance spans possible with Fibre Channel, you get centralized storage with the flexibility of physica location. For example, you ca locate a tape library near user who need access to it and kee the servers and disks in a se cure data center. Likewise, off site backups linked directly t SAN-attached storage are pos sible, decreasing the logistica demands of a full-fledged dis aster-recovery strategy.

Today's SAN solution solve some fundamental storage management problems. A SAN hardware and softwar technology continues to ad vance, even greater storag management possibilities wi be realized.

Eric Hammond (ehammond@earthlink.ne is a free-lance writer and developer at View mark, an Englewood, Colo.-based medic design company.

Web resources

Fibre Channel technology	
Fibre Channel Industry Association (FCIA)	www.fibrechannel.com
Additional Fibre Channel information	www.fcloop.org
SAN technology	
Storage Networking Industry Association	www.snia.org
Vendor information	
IBM	www.ibm.com/san
Storage Technology	www.storagetek.com
ADIC	www.adic.com
EMC	www.emc.com
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STORAGE-AREA NETWORKS

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SANs show potential, but limitations remain

The storage-area network (SAN) clearly has a great deal of potential to ease many enterprise storage problems. But some of the gains are just that: potential. Although Fibre Channel technology has been around for some time, the hardware and software technology that utilizes Fibre Channel is relatively immature. Let's look at what that means if you are interested in SANs.

Interoperability is the greatest challenge facing a SAN implementation today, and it may appear in many different places throughout the architecture.

First, Fibre Channel devices from different vendors may not get along well on the same network. It's crucial to investigate interoperability issues before deploying your SAN, especially if it contains components from different vendors.

The second interoperability issue is on the server side. Not all servers support native Fibre Channel connections. You may have to use a Fibre Channel-to-SCSI bridge if you don't confirm Fibre Channel compatibility on your server hardware.

Third, interoperability with desktop operating systems, as well as many third-party applications, don't support SAN-attached storage. The easiest way to solve this may be to give clients access to SAN data via Fibre Channel attached servers.

You can do powerful things with the SAN architecture today, but many SAN benefits are still pipe dreams — for now. Consider the serverless backup, wherein a disk system is backed up directly to tape without the intervention of a server. The SAN architecture is robust enough to support this configuration, but the necessary application software needs further development.

Another limitation of today's SAN is the distance over which a Fibre Channel connection can be made. The current limit on this type of connection is near 10 kilometers. Recent industry announcements indicate that the number is headed for 45 kilometers soon, though your mileage may vary. Campuswide, or even crosstown SANs, are possible today. But don't expect a a company's SAN to spread from coast to coast until a few years from now.

Another problem cited by vendors as a hindrance to a successful SAN implementation is the lack of training and qualified people. Bringing your staff up to speed on the technology behind a SAN can take a while.

And of course, high prices will keep some folks away. When you look at the storage devices on a SAN, look at the types of servers it takes to move data through a SAN, and look at how much a SAN component costs. Then you will understand why there are few SANs without six-figure price tags.

Infrastructure

TCP/IP, LAN/WAN Switches, Routers, Hubs, Access Devices, Clients, Servers, Operating Systems, VPNs, Networked Storage

Briefs

Hewlett-Packard last week shipped a switch module that supports Gigabit Ethernet over Category-5 wiring. At an estimated street price of $300, the ProCurve 1000Base-T module costs one-third as much as HP's fiber-optic Gigabit Ethernet connections. It fits into HP's ProCurve 8000M, 4000M, 1600M and 2424M switches.

HP: www.hp.com/go/procurve

Callisto Software has released Orbiter SMS Connector, which integrates with Microsoft's Systems Management Server and provides automatic software distribution to mobile users. The company also released Orbiter 3.1, its own mobile systems management software for Windows NT. This product features software distribution, inventory, troubleshooting and job scheduling tools. Orbiter 3.1 pricing starts at $150 per seat. Orbiter SMS Connector is priced at $2,000.

Callisto: www.callisto.com

Network Integrity will start offering customers of its LiveVault software the ability to back up data across the Internet. Previously, the software worked over LANs and private networks. LiveVault backs up changes to data in real time, copying only the changed parts of files on a server to a separate server. Network Integrity is partnering with Imation to offer backup services over the 'Net. The service will enable companies to back up data on servers at remote offices to data centers run by Imation. LiveVault software costs $3,000 for each storage server and $2,000 per backed up server. Pricing varies for the service.

Network Integrity: www.networkintegrity.com

Sun opens Solaris source code, sort of

Developers can examine the code, but Sun licensing limits what programmers can do with it.

BY DENI CONNOR

Sun's hint that it will open up its Solaris source code was welcomed by members of the Linux open source community as validation of the principles of open source; but the move was derided by other programmers, who say it isn't enough.

The reaction came in response to an announcement by Greg Papadopoulos, Sun's chief technology officer. Papadopoulos said the company intends to open its operating system code to the programmer community under the restrictions of its Sun Community Source License (SCSL).

However, SCSL exacts a heavy price from developers who choose to look at the code, analysts say. Programmers can examine Solaris source code for research purposes and submit bug fixes to Sun. However, they are not allowed to develop products based on the code without ponying up license fees and receiving Sun's approval.

SCSL differs from the GNU General Public License (GPL), under which programmers develop Linux applications. A group of programmers launched the GNU project in 1984 to develop a free Unix operating system, called GNU. Linux is a variant of GNU. GNU GPL requires that programmers make the source code to their developments available to others. Developers can create programs based on the source code but cannot make changes to it.

Linux creator Linus Torvalds applauded Sun's move but said it doesn't grant enough freedom to developers.

While Sun's move was applauded by most Linux developers, it was also roundly criticized. Linus Torvalds, the creator of Linux, was one of the first people to applaud Sun for "acknowledging how powerful open source is as a medium." However, he also explained that Sun's version of community source isn't open enough to let anybody use it freely.

"It results in a kind of 'read-only access' for programmers," Torvalds says. "To distribute it commercially, you have to come to an agreement with Sun, so it's not going to result in the kind of third-party proliferation that drives Linux."

Another programmer agrees but cites caution. "Sun is tempting the curious to peek at the code and then making them pretend they never saw it," says Terry Ahnstedt, a Windows NT programmer at Tivoli. Ahnstedt says this situation makes it difficult for programmers to write code that does not incorporate any of

See **Sun**, page 20

IBM putting a Big Blue stamp on Linux

PC server division touts operating system as an alternative to Windows NT.

BY MARC SONGINI

If you've wanted to try Linux but have had cold feet because it's fairly untested in the enterprise network arena, take heart: IBM is putting some of its considerable muscle behind the technology.

Big Blue is the hardware vendor most aggressively offering Linux on its servers, says Stacey Quandt, an analyst at Giga Information Group, a consultancy in Cambridge, Mass.

IBM also has some of the most comprehensive service and support for the operating system.

While Compaq, Dell and Hewlett-Packard also offer Linux on their servers, they are doing so with less fervor than IBM, Quandt says. For instance, Dell offers only the Red Hat Software version of Linux, while IBM offers all major flavors.

Dell also offers support through a third-party vendor, while IBM has its own personnel to assist Linux users, Quandt notes.

Across the board support

IBM's Netfinity PC server unit is actively promoting Linux as a viable, less-expensive alternative to Windows NT. The RS/6000 division has also made its servers Linux-friendly. Additionally, applications that work on Monterey — IBM's upcoming 64-bit Unix for Intel servers — will also run on Linux boxes. IBM's Lotus has announced it will roll out a version of Domino for Linux sometime this year, and Tivoli plans to offer management tools for Linux servers.

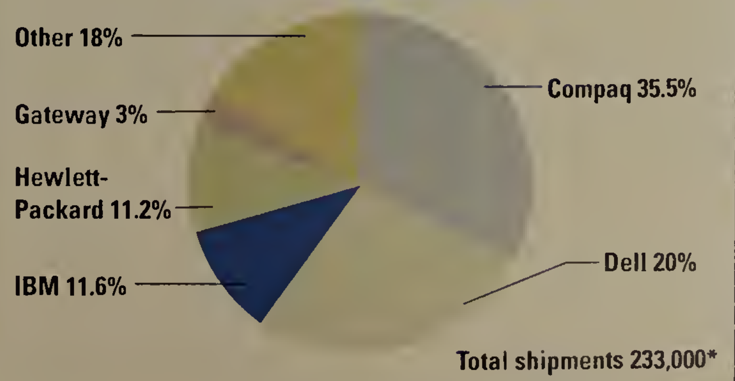
IBM has been training its sales force to offer Linux to customers and even has 300 Linux specialists in its Global Services Division. IBM also works with Linux

See **IBM**, page 25

IBM to ship Linux servers

IBM hopes to give its PC server shipments a boost by offering the popular Linux operating system on its Netfinity PC server line.

Q1 '99 U.S. PC server shipments



Total shipments 233,000*

*Preliminary shipments

SOURCE: IDC, FRAMINGHAM, MASS.

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Sun,
continued from page 17

the information they viewed. For instance, a Linux developer might accidentally contribute code derived from Solaris into Linux and put Linux at risk over patent issues. "You almost need to set up a clean-room development environment," he says.

In addition to breaking Solaris licensing issues, Sun's port of the operating system is complicated by trademark and licensing from other vendors. Solaris is based, in part, on The Open Group's Unix 98 and the University of California's Berkeley BSD 4.3 system.

SCSL is no different than the agreement Sun requires Java, SPARC or Jini developers to sign, says Stacey Quandt, an analyst with Giga Information Group in Santa Clara, Calif. "Sun is trying to create a community where any developments stay within the community. They've created a Chinese wall to keep everything inside," Quandt says.

Drawing yawns

Until Sun adopts full measures and a true open source license, its "half measures will draw only yawns, and developers will put their Solaris CDs in the microwave to watch the sparks," says Donald Marti of the Silicon Valley Linux Users Group.

Nearly every other systems company has drawn the applause of the open source community for their contributions. IBM recently began to offer a Java compiler and Java Unicode classes under an agreement approved by the Open Source Initiative.

Unicode defines a universal character set that allows all languages to be expressed as a common data format. Apple says it would contribute the Darwin operating system for its Mac OS X server, through a license approved by the Open Source Initiative.

Hewlett-Packard last summer announced that it would work with Puffin Group to port Linux to the PA-RISC platform.

SGI also announced earlier this year that it would distribute its XFS file system to the open source community.

The Santa Cruz Operation and Starnix will license their System Activity Reporter source code, which is used to retrieve data for administering the UnixWare 7 System V Release 5 kernel. This will help standardize kernel administration across operating systems, according to vendor claims.

Intel, Cygnus, HP, IBM, SGI and VA Linux Systems are working on the Trillian Project, a Linux port to the Itanium platform, and making it available to the open source software community. Itanium is the newly minted name for Intel's 64-bit Merced processor. It will be available mid-2000. ◪

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- Sun's announcement about its open source plans.
- Solaris' new features, includes data sheets and white papers.

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3Com unleashes barrage of small-office network gear

New OfficeConnect products — from firewalls to cable modems — are designed to ease network installations.

BY JIM DUFFY

SANTA CLARA, CALIF. — 3Com has broadened its portfolio of small-office products with 12 new or enhanced offerings designed to make network installation as easy as plugging in a toaster.

3Com has also entered into strategic relationships with Hewlett-Packard and other companies to make it easier for small-business customers to implement its net products.

The new and enhanced 3Com OfficeConnect products have been redesigned with an ergonomic and contemporary look, and a stacking system designed to simplify deployment.

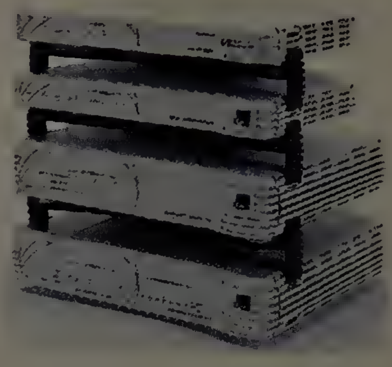
"There is strong, pent-up demand for easy-to-use network/electronic commerce products for small businesses," says Jeremy Duke, president of Synergy Research Group in Phoenix. "The industry has a long way to go to have utility-like connectivity. The rate of technical change is so rapid that complexity will be part of the package for a long time."

The enhanced OfficeConnect products include:

- OfficeConnect Fast Ethernet Networking Kit, which includes two 10/100 network interface cards (NIC), a four-port hub, cables and software.
- OfficeConnect Network Assistant CD-ROM Version 2, which guides users step by step through the process of setting up and operating an integrated small-business network, including Internet connectivity, network printing and enhanced trouble-shooting.
- OfficeConnect Fast Ethernet PCI NIC.
- OfficeConnect 10/100 LAN PC Card for laptop users.
- OfficeConnect Remote 840 SDSL Router, which is an IP/IPX router with an integrated four-port Ethernet hub that offers symmetrical digital subscriber line (SDSL) access to the corporate network or Internet.

> **"There is strong, pent-up demand for easy-to-use network/electronic commerce products. . . "**
>
> Jeremy Duke, president, Synergy Research Group

- OfficeConnect Dual-Mode Cable Modem, which allows Internet connectivity over two-way and traditional one-way cable television networks.
- OfficeConnect 56K LAN Modem, which combines a four-port Ethernet hub, modem and router to enable multiple users to share a single 56K bit/sec Internet connection. It now includes fax capabilities and dial-in access for remote access applications.
- OfficeConnect ISDN LAN Modem, which combines a four-port Ethernet hub, modem and router, letting multiple users share a single ISDN Internet connection. It now features dial-in access for remote access applications.
- OfficeConnect 56K Business Modem, which features USB and RS232 connection options and is compatible with PC and Apple Macintosh computer systems.
- OfficeConnect Internet Firewall 25, which is designed to protect the LAN from unauthorized access and prevents denial-of-service attacks from the Internet. It has two Ethernet ports and supports up to 25 LAN users.
- OfficeConnect Internet Firewall DMZ, which offers the same features as the Internet Firewall 25 but supports up to 100 LAN users and has an additional Ethernet DMZ port. This allows public Web or FTP servers on the LAN to be accessed from the Internet without exposing the network to attack.
- OfficeConnect Web Site Filter for Internet Firewalls, which can be used with either of the OfficeConnect Internet Firewalls to extend their functionality. It can control access to thousands of Web sites deemed inappropriate for business use.



3Com hopes this OfficeConnect Stack will make network implementation easier for small companies.

In addition to the product redesign and the new stacking systems, 3Com has added color-coded packaging to the OfficeConnect products to help people easily identify them. All OfficeConnect WAN products, including the OfficeConnect LAN Modem, are coded in red; LAN products, including OfficeConnect hubs, switches, NICs and PC cards, are coded in blue; and print servers and firewalls are coded in green.

To simplify the purchase and installation of these products, 3Com has teamed with mail-order PC giants Micron Electronics and Gateway, in addition to HP. Micron offers small-business customers a preconfigured and tested network product that includes 3Com's OfficeConnect 56K LAN Modem and OfficeConnect Dual Speed Hub 8.

Gateway Computers is offering 3Com's OfficeConnect Dual Speed Hub 8 and OfficeConnect Dual Speed Hub 16 through its direct, online, storefront, partner and reseller channels. HP is offering its HP JetDirect 170X and 300X OfficeConnect Print Servers with the OfficeConnect products.

The Network Assistant CD-ROM costs $49. The list price for 3Com's OfficeConnect Fast Ethernet Networking Kit is $215.

The OfficeConnect Fast Ethernet Network Interface Card costs $75. The 10/100 LAN PC Card costs $99. The OfficeConnect Remote 840 SDSL Router costs $595.

The OfficeConnect Internet Firewall 25 costs $695. The OfficeConnect Internet Firewall DMZ is $1,495. The OfficeConnect Web Site Filter is $195 for a 12-month subscription.

The OfficeConnect 56K LAN Modem costs $349 and the OfficeConnect ISDN LAN Modem costs $499. The 56K Business Modem costs $239.

All products are available now.

3Com: www.3com.com

Network hardware built to stand up to earthquakes, fires and more

Belobox technology targeted at Internet server farms, electronic commerce sites and other nonstop applications.

BY JIM DUFFY

IRVINE, CALIF. — Belobox Networks has introduced a high-performance network hardware platform it claims can withstand destructive events — earthquakes, fires or bombings — and perform submillisecond self-healing with no loss of data.

The firm's Advanced multiprocessing Network (AmpNet) consists of hub and network interface card (NIC) modules for VME- and PCI-bus-based hardware chassis. AmpNet is fault and damage tolerant, and can support point-to-point connections between pairs of nodes, or broadcast to all nodes at once.

In addition to standard TCP/IP compatibility, AmpNet supports the Virtual Interface Architecture (VIA) standard for system-area networks, jointly promoted by Compaq, Intel and Microsoft. This support ensures that AmpNet technology can be integrated into standards-based environments, Belobox says.

System-area networks are groups of computers working on a single task or project, rather than independent functions. System-area nets are used to meet the high-volume computing requirements of government and commercial high-end enterprise applications.

AmpNet is targeted at applications requiring nonstop operations, such as Internet server farms and electronic commerce.

The foundation of AmpNet's fault tolerance is a technology called Network Cache Architecture. Network Cache enables automatic network fault and damage detection with submillisecond dynamic reconfiguration, Belobox says.

AmpNet also employs a technology called MicroPacket to maximize efficiency of broadcast and unicast traffic. MicroPackets are 12 bytes in length and carry diagnostic, control, configuration management and data-transfer information. The small size of the MicroPacket increases performance and decreases latency, Belobox claims.

AmpNet supports data rates of 255M byte/sec over gigabit media, Belobox says.

AmpNet NICs begin at $2,000 for PCI-based servers, and $4,000 for CompactPCI and VME systems. Supported operating systems include Windows 2000, Linux and other versions of Unix. Products are scheduled for year-end availability.

Belobox: www.belobox.com.

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IBM,

continued from page 17

vendor Caldera Systems to train resellers to deliver Linux offerings.

Big Blue is as serious about Linux as it is about any other operating system it offers, such as AIX, OS/400 or S/390, says Mike Riegel, an IBM executive.

But while the sales force is being educated about the operating system and its benefits, they "will not be pushing Linux" over other choices, Riegel says. They will simply offer it to customers and let the customers decide if it will be Linux, NT or Novell.

Reliable support has always been an issue with Linux implementations, and IBM is trying to address that concern.

> **"All the major vendors are hedging their bets with Linux."**
>
> Stacey Quandt, Giga Information Group

Quandt says IBM can make money by providing services and support for Linux through the vast IBM Global Services Division. Quandt declined to say just how much money Linux could bring IBM.

PC servers lead the charge

Nowhere in IBM is the push for Linux support greater than in its Netfinity division. The unit is even offering a certification program to test applications from 50 independent software vendors (ISV) for use on Linux-equipped boxes and 90-day technical start-up assistance for Linux users.

The thin software kernel lets Linux handle IP requests very quickly, making it attractive for users running Web servers, says Sandy Carter, an IBM executive. Other companies find that Linux works well for e-mail, file and print, and other basic applications, she says. Although she wouldn't be specific, Carter says the number of Netfinity installations of Linux is growing strongly.

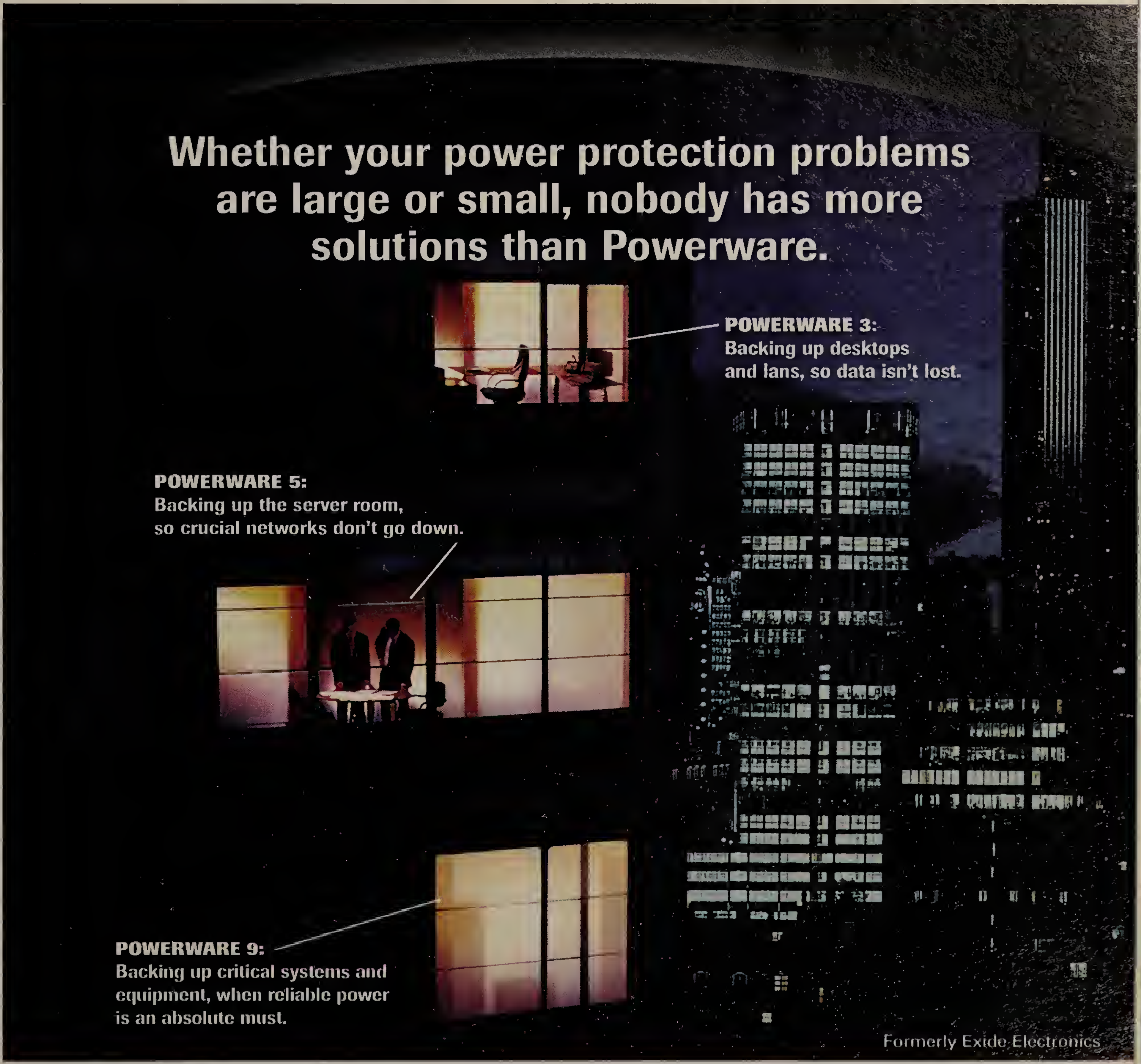
The reasons for the growth are many, users say. Linux is dependable and easy to install, and requires no licensing fees, says Brad Barrish, an executive at Wherehousemusic.com, a retailer with three Netfinity Linux servers that offer music to prospective customers.

The boxes have been running for four months and haven't had to be rebooted once. Barrish says IBM offered extensive support during the installation, and he is considering buying more Linux servers for his company.

Caveats

Despite IBM's support of Linux, there are still some issues. For one thing, major ISVs have just started seriously porting their applications to support Linux PC server platform over the past year, says James Gruener, analyst with Boston-based consultancy Aberdeen Group.

"All the major vendors are hedging their bets with Linux," Giga's Quandt says. Linux needs to become more scalable and be able to handle symmetric multiprocessing, she says. ◪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HolonTech offers bulletproof Windows clustering box

BY JOHN FONTANA

HolonTech Corp., this week will unveil a load-balancing device that will let users monitor the health of servers and applications in a Windows cluster, and perform failure detection and system recovery.

Hyper ECS, which HolonTech developed with Microsoft, is a 16-port switch that allows for up to 256 nodes in a cluster or clusters. Hyper ECS has borrowed high availability, traffic distribution and load balancing from HolonTech's popular HyperFlow 2 load-balancing switch and embedded software components of Microsoft's Cluster Service (MSCS) APIs.

The switch — which is targeted at supporting large Web server farms running on Windows NT and 2000 — also can define a class of service for particular users based on server load.

Hyper ECS works exclusively with Windows NT 4.0 Enterprise Edition, the forthcoming Windows 2000 and Microsoft's Internet Information Server. HolonTech is developing a similar switch for Unix and Linux systems.

The switch will let IT executives with a growing number of Web applications running on a Windows platform create large, fault-tolerant Web server farms.

"NT clustering will be an important technology over the next two years," says Peter Christy, an analyst with Internet Research Group, a research and consulting firm in Los Altos, Calif. "When Microsoft developed NT, they didn't make clustering a priority, but if they want to make a stronger play against Unix, they need to develop the technology. HolonTech appears to be taking steps in the right direction."

Clustering is becoming an important technology in the Web world. It is used to tie servers together so they perform as a logical whole, which improves the availability, scalability and manageability of applications or data residing on those servers.

HolonTech's Hyper ECS device ties together up to 256 nodes in a cluster.

To reap the benefits, HolonTech embedded Microsoft's Quorum Resource Manager (QRM), a component of MSCS, into Hyper ECS. With QRM, the switch becomes the brains of a cluster and can monitor the availability of servers and applications, as well as detect and correct server failures.

The MSCS APIs also are being used by vendors such as IBM, which developed Netfinity Availability Extensions for MSCS to boost NT clustering to four nodes on its line of servers.

HolonTech's use of MSCS is interesting because the APIs weren't designed for clustering Web servers in a multitiered environment. Their chief use is for scalability and reliability in clusters of Exchange messaging and SQL database servers.

"MSCS only supports two-node clustering, one active and one passive," says Sri Chaganty, vice president of engineering for HolonTech. MSCS's so-called failover model means one server is always idle and in standby mode. "That is not a good model for scalability in a Web server environment," Chaganty says.

With Hyper ECS all servers in a cluster are active at the same time. It can support clusters of up to 16 Web servers per port and connect Web server clusters to clusters of SQL Server to support high-end Web applications. It also has a single management console that snaps in to the Microsoft Management Console. Using MSCS APIs, the switch also can check traffic levels on data paths to ensure guaranteed levels of service.

The switch is expected to be available this week and is priced at $25,000 per five clusters.

HolonTech: www.holontech.com

Alcatel takes aim at the branch office

Products from five acquired companies to deliver integrated voice/data support.

BY TIM GREENE

Alcatel has figured out what it is going to do with the five network equipment vendors it bought for $4.35 billion over the past 11 months: sell integrated voice and data gear to enterprise branch office customers.

Alcatel recently outlined its plan for the technology acquired when it bought Assured Access, Genesys Telecommunications Laboratories, Internet Devices, Packet Engines and Xylan, starting with a line of switch/routers designed for corporate branch offices.

The European telecom equipment company has decided not to compete with enterprise network giants Cisco, 3Com, Nortel Networks and Lucent for their core routing business and to focus instead on the needs of remote locations.

Alcatel will make its foray into this area in December with the introduction of its OmniAccess line of branch office switch/routers, which are based on Xylan's hardware platform.

Next year, Alcatel will introduce IP voice cards for the modular OmniAccess chassis, and enable the switch/routers to work with virtual private network (VPN) offerings obtained from Internet Devices. Later, the VPN support will be built into OmniAccess devices, Alcatel says.

Toward the end of next year, Alcatel will offer a version of OmniAccess for single-site small to midsize businesses, incorporating PBX functions in the box. The firm envisions that ISPs or competitive local carriers will use the OmniAccess boxes to provision voice and data services over IP networks, says Joelle Gauthier, vice president of marketing for Alcatel's internetworking division. Alcatel next year also will seek partners to supply SNA support for the gear.

Beyond that, the plan calls for a Gigabit Ethernet LAN port on the OmniAccess gear as well as a beefed-up firewall and analog voice support, she says.

The box to be introduced in December is OmniAccess 512, a WAN switch/router sporting 12 fixed 10/100 Ethernet ports and optional WAN ports for T-1 or ISDN. It also has a serial port to connect to other network gear. Pricing has not been set.

OmniAccess will enforce quality of service (QoS) as set by PolicyView, a new network management platform. PolicyView will also map LAN QoS policies to the WAN using Resource Reservation Protocol to establish appropriate bandwidth for applications. It will employ traffic-shaping technology from Packet Engines to avoid bottlenecks at the LAN/WAN interface.

Gear that Alcatel makes for carrier nets, including access devices from Assured Access, will carry QoS requests throughout the service-provider net.

Using the Xylan gear as the basis of the new family is a good strategy because Xylan gear is stable, and the firm established a solid customer base, says Ron Westfall, an analyst with Current Analysis.

Alcatel: www.alcatel.com

Alcatel will cater to branch offices

Look for integrated voice and data branch office gear from Alcatel over the next year:

- OmniAccess switch/routers with T-1, ISDN and serial ports for WAN links.
- PolicyView management to define quality of service and integration with Alcatel carrier gear to guarantee QoS across networks.
- Integration of IP voice, PBX and virtual private network capabilities in OmniAccess.
- Partnerships with other vendors to supply performance monitoring and reporting tools.

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Wired Windows . Dave Kearns

SERVICE PACKS THAT ARE ANYTHING BUT

It seemed like a good idea at the time. Last spring, Novell announced the first consolidated support pack (CSP) for all major products, a CD containing the most important bug fixes and patches for NetWare, ManageWise, GroupWise and BorderManager. As an added benefit, all the patches on the CD would be tested and released together, thus (Novell says) increasing stability and reducing conflicts. Network professionals could feel safer about immediately installing the new, more reliable support packs.

In August, reality set in when the second CSP was released. The lucky folks, seemingly, were those using the German language version of NetWare 5. Because of a syntax error introduced after testing was completed, the install script simply wouldn't run.

Also, a small but significant group of network managers found that after installing the NetWare 5 support pack, their new Novell Storage Services (NSS) volumes simply disappeared. It seems the NetWare engineering team ignored the policy of not introducing new technology in a support pack. New NSS code, needed for NetWare 5.1 (due out later this year) was introduced and, in specific circumstances, simply refused to recognize existing NSS volumes.

But it wasn't only NetWare 5 users who got stung. The NetWare 4 support pack managed to disable the backup and archival software used by most NetWare 4 sites.

Novell Support's rapid response group swung into action as soon as the problems surfaced.

The German install script was easy enough to fix — removing a stray dash did it — so customers could fix the problem without having another patch released. The NetWare 4 backup problem could be fixed by using the support modules from the previous support pack.

The NSS problem was harder to reproduce, but as soon as it was the support pack was pulled.

Customers who received the CSP disk along with their monthly subscription to the Novell Support Connection CD received a letter warning them of the possible damage. Inexplicably, though, it took two weeks for the letter to get from Provo to customers.

A new support pack for NetWare 5 was just released fixing the NSS problem. Early reports indicate that it affects the ability of some server hardware to keep accurate time.

There's got to be a better way, Novell.

Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. He can be reached at wired@vquill.com.

Tip of The Week

I'm sure you're frequently asked by your neighbors to explain, help set up and troubleshoot the tiny networks they're adding to their homes. You'd like to help, but you don't have the time to do the work yourself. Now there's an excellent book, *The Little Network Book for Windows and Macintosh (Peachpit Press)*, that explains it all without condescension.

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When a manufactured housing retailer with hundreds of home centers nationwide needed a powerful solution to provide better customer service and enable JIT manufacturing, the challenges were many. The company's geographically dispersed staff of computer novices needed ready access to information as well as collaborative tools. In addition, an aggressive timeline and stringent cost-efficiency imperatives meant additional IT staff was out of the question.

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Carriers & ISPs

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Briefs

One of the few competitive local exchange carriers (CLEC) that have targeted the residential market just got a big boost. Microsoft co-founder **Paul Allen** is taking a $1.65 billion stake in **RCN,** a CLEC that offers a combination of telephony and broadband Internet access via utility, cable and other available facilities. Allen will make the investment through **Vulcan Ventures,** his venture capital firm. Bell companies have pointed to RCN as proof that residential competition is possible, accusing other CLECs of deliberately shunning the residential market.

Paul Allen buys into broadband.

If you want to build an international virtual private network fed by digital subscriber line (DSL) circuits, you might want to contact **Rhythms NetConnections.** The company plans to form a joint venture called **Rhythms Canada** with Canada-based **Optel Communications,** another DSL provider. Customers will be able to link sites that span the border via their shared backbone or over the Internet. Rhythms says this is the first of several ventures to link its U.S. network with networks in other countries.

Rhythms also recently announced an alliance with **Microsoft** to provide the high-speed connections needed by the **Windows Media Broadband Jumpstart initiative,** Microsoft's effort to encourage the use of broadband technologies in homes and businesses. An alliance of vendors will create a model for delivering streaming audio and video to desktops. Trials start in Boston in the fourth quarter.

Rhythms: www.rhythms.com

Nortel's Shasta gear adds security to DSL

Shasta 5000 promotes quality-of-service levels by traffic type.

BY TIM GREENE

SANTA CLARA, CALIF. — Nortel Networks has begun shipping Shasta 5000, a broadband service node that the company claims will help make dedicated digital subscriber line (DSL) connections to the Internet more secure.

A major problem the Shasta gear tries to address is the fact that new access technologies such as DSL and cable modems never break their connection to the Internet.

"When the connection is always on, you are more susceptible to hacking," says Ron Westfall, an analyst with Current Analysis in Sterling, Va. People trying to break into your network at that point can do so at their leisure.

But with Nortel's gear in place, service providers can shore up that weak link with a variety of measures.

First, the gear can encrypt an individual customer's traffic using Data Encryption Standard (DES) or Triple-DES encryption before it crosses the Internet, protecting the traffic from prying eyes. And second, Shasta 5000 can impose a firewall on any customer's traffic to prevent unauthorized use of the Internet connection into and out of the customer site.

DSL Networks, a competitive local carrier based in San Francisco, is using these features to provision carrier-based virtual private networks (VPN). For example, customer sites can be connected over the Internet using encrypted tunnels that are set up and torn down with the Nortel gear, according to Brad Connors, president and CEO of DSL Networks.

Each site is connected to a Shasta box in DSL Networks' network via DSL, and the Shasta box encrypts the traffic if it is bound for another corporate site, and drops it on the Internet. Another Shasta 5000 at the DSL Networks point of presence nearest the second site decrypts the traffic.

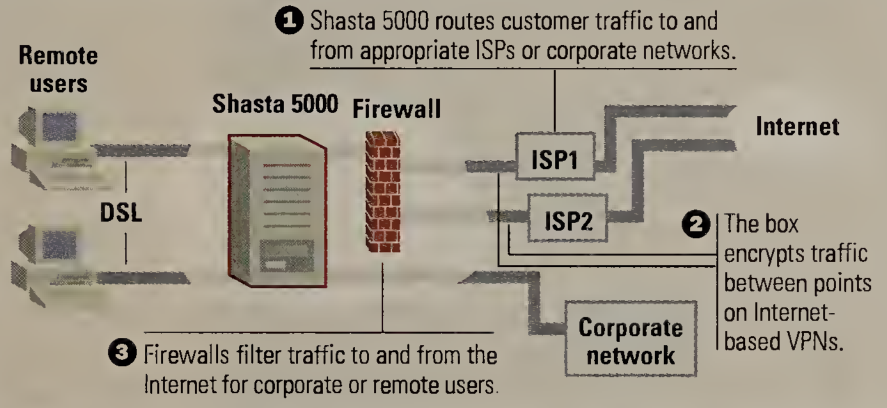
The arrangement assumes the customer believes that the DSL link is secure because the traffic travels over it unencrypted, Connors says.

If customers want to limit Internet access, say to just other sites on the VPN, DSL Networks can accomplish that by

See **Nortel**, page 35

Shasta adds features to DSL services

Nortel Networks' Shasta 5000 broadband service node gives carriers the ability to add features to simple access lines.



❶ Shasta 5000 routes customer traffic to and from appropriate ISPs or corporate networks.

❷ The box encrypts traffic between points on Internet-based VPNs.

❸ Firewalls filter traffic to and from the Internet for corporate or remote users.

GTE waives frame installation charges

BY DAVID ROHDE

IRVING, TEXAS — Local services powerhouse GTE is giving customers a break on new frame relay orders placed between now and year-end.

According to documents filed at the Federal Communications Commission, the telephone company is waiving installation fees on all frame relay circuits, from 56K bit/sec to T-3. The promotion went into effect on Oct. 1 and is available in 13 states — a wide swath of GTE's sprawling national territory.

Waivers of installation charges — generally called "nonrecurring charges" at telephone companies — are not unusual. But waivers are frequently employed on new rather than mature services, points out Steve Taylor, president of Distributed Networking Architects, a broadband consulting firm in Greensboro, N.C. Other times they are part of negotiated deals rather than a blanket offer.

GTE's offer could be particularly significant because under one of its frame relay plans, the price for the frame relay port is bundled with the price of the corresponding dedicated access line. Under this plan, the installation price for the entire arrangement — for example, $295 for each 56K circuit and $395 for a T-1 — is being waived (see graphic).

Long-distance carriers, on the other hand, typically charge separately for the access line. So even if the frame relay port charge is waived, the user could still be hit with an installation charge to connect to the central office.

To round out the offering, GTE is waiving installation charges on Network-to-Network Interfaces, which are connections to other carriers' frame relay networks to fill out geographic coverage, and whose charges are typically passed along to users. ◪

A break to get going

The installation fee, or nonrecurring charge, under GTE's normal frame relay price schedule is waived for a three-month promotional period.

Port speed	Nonrecurring charge waived	Monthly rate
56/64K bit/sec	$295	$140 per month
1.544M bit/sec	$395	$625 per month

AT&T, cable allies accused of hardball tactics

BY DAVID ROHDE

WASHINGTON, D.C. — AT&T is stepping up its policy of refusing to provide broadband cable access to areas where local government insists that it open the network to all ISPs. The local governments and their allies are also fighting back, all but accusing the telecom giant of blackmail.

At stake: Whether or not end users — first residential telecommuters and eventually users on business premises under AT&T's new cable policy — can get broadband cable-modem service anytime soon and from what provider.

The latest fight has broken out in Somerville, Mass., a Boston suburb where the mayor recently asked the Federal Communications Commission for an advisory opinion on whether cities can require open ISP access.

Local officials allege that because Mayor Dorothy Kelly Gay raised the possibility of open access in a formal FCC letter, the local cable company, MediaOne, decided to "reassess" rolling out cable-modem service. AT&T is attempting to buy MediaOne, and the city of Somerville was thinking of attaching an open-access mandate to AT&T's local application to take over the MediaOne franchise.

In a letter to MediaOne, U.S. Rep. Michael Capuano (D-Mass.) accused MediaOne of hardball tactics. "It is clear that this decision is intended as some sort of 'payback' rather than an ordinary business decision," Capuano wrote.

Similar fights are breaking out elsewhere. After the city of Fairfax, Va., last month attached an open-access mandate to a cable license transfer, the new cable company — Cox Communications, considered another possible partner for AT&T — said it might not deploy a cable-modem service that had already been widely advertised.

Fairfax officials didn't back down. "By taking this action and supporting open access, we have ensured that our citizens will continue to have the freedom to choose their Internet provider," said city councilman Scott Silverthorne.

These incidents follow fights in Miami, Minnesota and elsewhere after a federal court ruled the city of Portland, Ore., could impose an open-access requirement on AT&T. This emboldened others who had almost given up on getting their way with AT&T.

But AT&T picked up a new ally late last month: the trade association for companies such as Nortel Networks and Lucent that make telecom equipment. Matthew Flanigan, president of the Telecommunications Industry Association, wrote to House Commerce Committee Chairman Tom Bliley (R-Va.) telling him to back off plans to address the issue in Congress.

Flanigan said new open-access regulations would "chill" the investments being made in broadband local loops. "The broadband services market is so new that no industry segment controls it," he wrote. "These companies need to be given an opportunity to reap the rewards, and assume the risks, of the substantial investments they are making."

AT&T recently said that part of its $140 billion plan for broadband cable services would be aimed directly at business locations, with trials set to begin in six cities later this year. ◪

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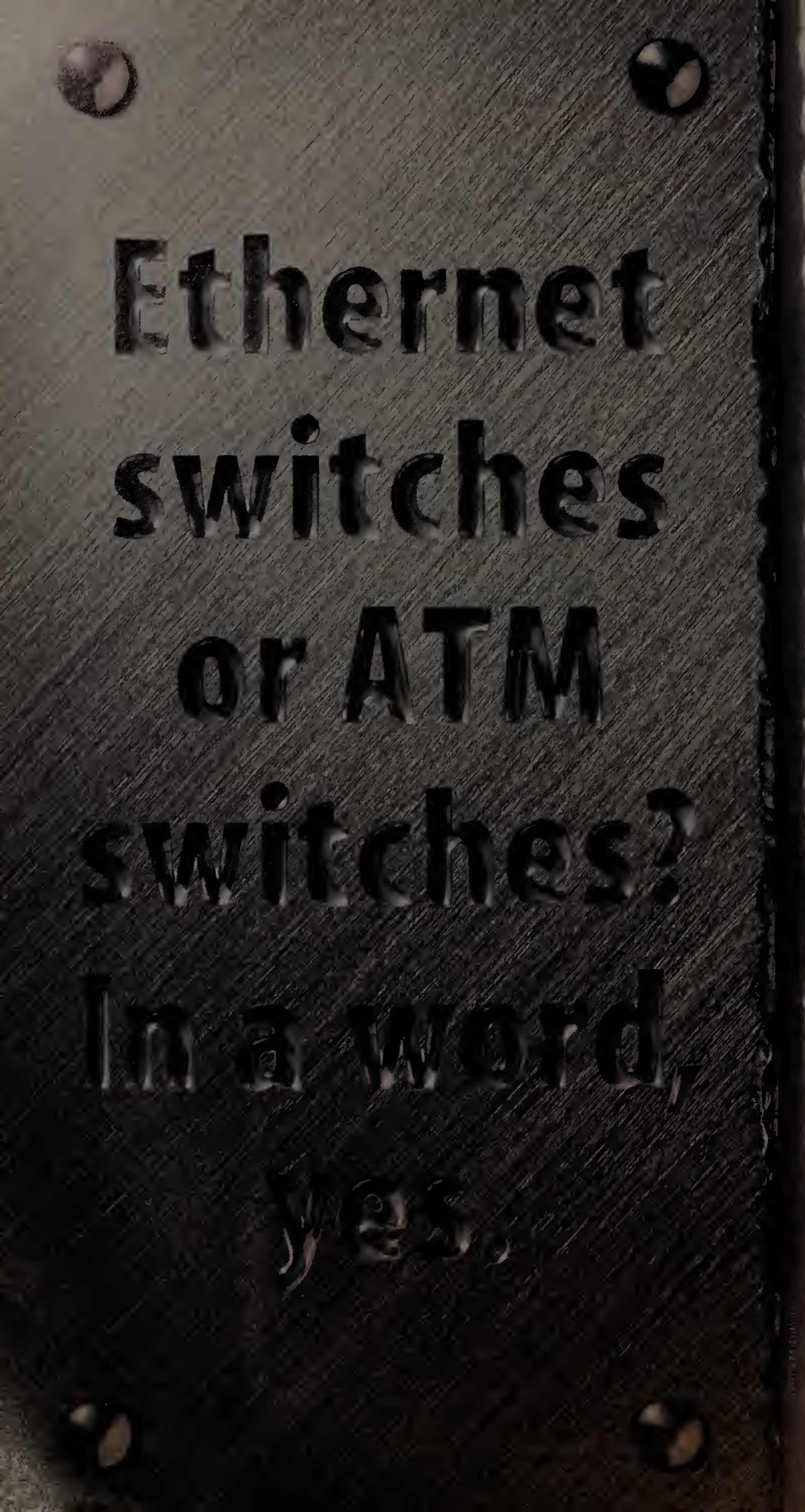
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BellSouth improves call centers

BY TIM GREENE

ATLANTA — BellSouth is betting that business customers would rather have someone else set up and maintain sophisticated new call centers than invest in staff to do the work.

BellSouth is dedicating a new business unit, Customer Interaction Services, to all aspects of call centers, from planning and the installation of equipment to staffing.

The unit has been in the making for about 18 months and is staffed by about 100 people, according to Tony Floyd, vice president and general manager of the division.

The call centers BellSouth envisions go beyond simply routing calls to live agents. The centers include integrating e-mail, voice recognition, Web chat, Web call-back and other technologies to suit individual customers.

The pharmacy at Winston-Salem Health Care in North Carolina used BellSouth to automate its prescription refill service because the health group didn't have staff expertise to handle the project, says Laura Vance, director of pharmacy services.

The company switched from live call agents to an automated system that can handle up to 24 simultaneous calls. The number of people staffing the phones dropped from a high of 10 to two, Vance says. The new system handles 1,100 calls per day, and the time patients spend on the line averages 2 minutes, which is 35 seconds less than they spent if they called a live agent.

Customer Interaction Services will plan call centers, get the hardware and software, customize and install it. BellSouth will also consult on where to place the call center based on where labor is available. And it will train agents in how to use the technology.

After a center is up and running, BellSouth will monitor calls and maintain the software.

Customer Interaction Services are available to midsize and large business customers based in BellSouth's nine-state region.

BellSouth: www.bellsouth.com

Nortel,
continued from page 31

imposing a firewall on traffic in and out of customer sites, Connors says.

One advantage to customers is that they have to add no VPN hardware or software or firewall equipment to their networks beyond the DSL connection. A possible drawback to customers is that they have no control over either the encryption or the firewall, which could make some customers shy away.

Shasta 5000 also supports quality of service by recognizing traffic types and assigning them relative precedence. For example, the Shasta equipment can recognize voice traffic and give it priority over e-mail.

Nortel: www.nortel.com

More Online

FIND IT ON FUSION DocFinder 5025

- Details of the Shasta 5000, including product specifications.
- Details of Nortel Networks' purchase of Shasta.

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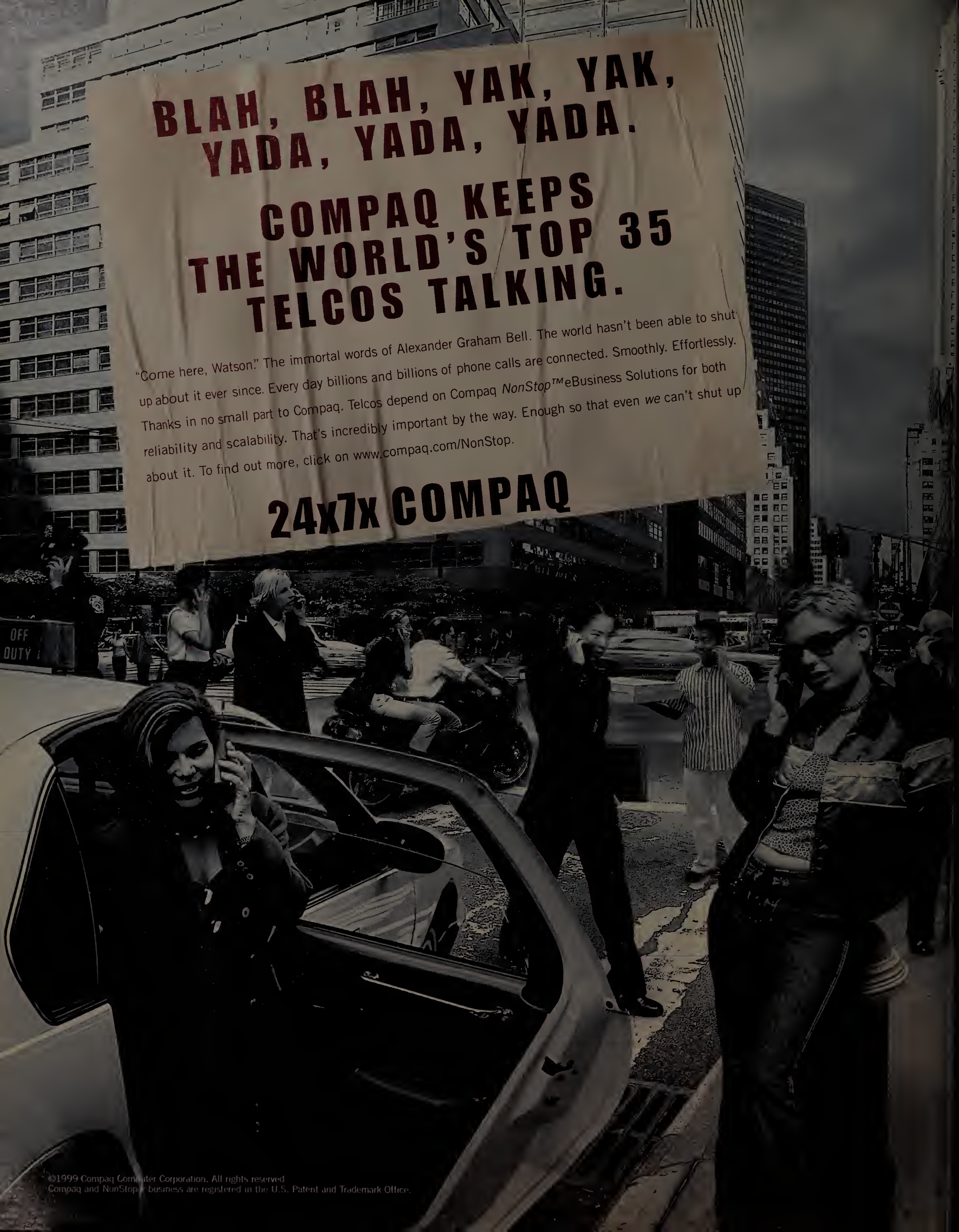

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Wan Monitor . Daniel Briere and Christine Heckart

WANT PRESS? FIRE BOOTH BABES, HIRE A LIMO

The question loomed large at NetWorld+Interop '99 Atlanta recently: How do vendors get the attention of the press and analysts when those folks barely get to the show floor?

Here are our top 10 ways to win us over:

10. Be cool. Who could resist the hit of the show, Awesome (as in Austin) Powers from TimeStep, the virtual private network guys? Simply listen to the humorous pitch and get an "awesome" '70s-style T-shirt.

9. Be famous. But don't forget who's paying the bills. Magicians Penn and Teller didn't really meld much of a pitch about SkyCache — distributors of Internet content via satellite — into their crowd-pleasing act.

8. Think kids. People who have kids will stop and listen if you have something neat for them. Just don't put us through the same pitch as attendees. Keep it short, then give us the flashlight. (Thanks Digital Lightwave.)

7. Think food. But don't just hand out ice cream bars: At least make us watch a 60-second video.

6. Dump the booth babes. (Danny just blanched.) If we see just a pretty face handing out trinkets, we will take the trinket and keep walking.

5. Ship it. If a company wants us to sit through its presentation, it will ship a small box of the related materials and goodies home for us.

4. Save the trees. How come product information, plus the two large speaker notes and conference notebooks, weren't distributed in electronic format? A CD-ROM version, plus press releases and other information, is a cost-effective alternative. Electronic distribution would offer content providers a chance to provide Internet links to new, updated content. Someone missed a chance to put technology to work, save some trees, lighten our load and make a name for themselves.

3. Be controversial. Gotta love PairGain's "Ask Us about Stinger" buttons in reference to Lucent's new product line — great marketing juxtaposition. Good buzz.

2. Bribe us (not literally). We're suckers for nice stuff, but nothing beats comfort and class. IPivot, a company speeding electronic commerce sites by superpowering Secure Sockets Layer streams, gave the press free limo rides around Atlanta. Getting a trip entailed: 1) calling the IPivot number, 2) asking for the IPivot operator, 3) the limo arriving with IPIVOT written on the side, and 4) the driver saying thanks for traveling with IPivot — four exposures, as the marketers say. Now if only someone would offer free movies on demand in our hotel rooms.

1. Accost us. Be so enthusiastic that we can't say "no." If all else fails, throw yourself at us. Kudos to the person from Blackberry.net who wanted to show me his all-in-one, two-way e-mail device that is as small as a pager. He just stayed on my heels until I stopped. The device seems neat. I will have to try one.

Briere is president and Heckart is vice president of TeleChoice, a consultancy in Boston. They can be reached at dbriere@telechoice.com and checkart@telechoice.com.

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Security Best Practices

As threats multiply, achieving end-to-end security becomes more complex

Every day, companies inadvertently risk their network security and potentially expose themselves to significant intelligence and financial losses. Sixty percent of Fortune 1000 companies have experienced major security breaches within the last 12 months, and financial losses caused by computer crime will reach $10 billion within two years, according to data from the 1999 FBI Computer Crime & Security Survey. Despite these chilling statistics, many administrators consider security a back burner issue.

"Mid-sized companies with emerging networks tend to think along the lines of, 'I'm too small; no one's going to go after me,'" says Steve Emerson, a former security risk analyst for the Department of Defense. "They don't want the hassle; they don't want the expense," he says.

By postponing, or ignoring, the security imperative, businesses endanger their system's integrity and expose their company's most critical data to damage and theft, both from internal and external threats.

For example, in an independent study from NFO Interactive, based in Toledo, Ohio, employees who use e-mail at work admitted that they have either (assumedly) accidentally transmitted or received confidential company information. Unfortunately, the Economic Espionage Act of 1996 decrees that unless you have "taken reasonable measures to keep such information secret" — such as strong encryption — there is little or nothing you can do about such misappropriation of trade secrets.

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Staff	1 employee	5 employees	ISOC
Design	Maybe	Experienced	Experienced
Monitoring	9-5	24x365	24x365
Administration	9-5	24x365	24x365
Backups	Maybe	Daily	Daily *
Scans	Maybe	Daily	Daily *

* Level 2 only

Key Costs	Customer-Managed, Min. Effort	Customer-Managed, Max. Effort	Sprint-Managed Level 1	Sprint-Managed Level 2
Salaries	$25,000	$125,000	——	——
Training	2,500	12,500	——	——
Software	5,000	5,000	——	——
Hardware	2,400	2,400	——	——
Service	3,660	3,660	——	——
Total Annual Cost	$38,560	$148,560	$12,000 ($16.5K 1st yr)	$30,000 ($36K 1st yr)

Another startling incident of security invasion involved a new employee of a small information security consulting group. To gain favor with his new employer, this eager hire offered two ZIP disks filled with data files from his previous employer — a competitor of his current company. Amazingly, the disks contained files from the company's Information Security Division, including marketing materials, media plans, technical methodology, competitive strategy, and pricing spreadsheets for all product lines, as well as full client deliverables complete with detailed information about client networks and systems, right down to the IP address and user account password level.

These and all too many other real-life episodes are the fabric of the network manager's nightmare. Ironically, however, this cloud both darkens and illuminates. As the information casualties mount, the ranks of security advocates gain converts who recognize the escalating need to assess and incorporate multi-level security into their data communication systems.

Begin with the End in Mind

With so many potential vulnerabilities, where do you begin? Security experts advise making a thorough assessment of your risks and needs. John Lawler, Product Line Manager for Virtual Private Networks (VPNs) at Concentric Network Corp., San Jose, Calif., and a security systems advisor and seminar leader, recommends beginning with an internal security needs audit.

"Clearly, the most important aspect is in the planning and design, which includes security and threat assessments, scans, audits, etc," says Lawler. "If you don't know what it is you are trying to protect, the chances of implementing the security technologies successfully are extremely low."

John Giubileo, Director of IP Security Services at Sprint Communications Co., headquartered in Washington, D.C., agrees. Giubileo suggests organizations develop a complete "security architecture," including such potential security needs as user authentication, perimeter defense, employee education, and physical security.

"There are so many aspects to security; to an applications developer security means something different than it does to the IT person," says Giubileo. "Companies must begin by clarifying, 'What exactly are we talking about when we say security?'"

Based on his many years in the business, Giubileo recommends that his clients start at the policy-making level, continue to the best practices and guidelines level, and then take it down to the keystroke level. "After you have a plan, your road map, then you can develop a security system to implement the plan. Attack each level of the OSI stack with components chosen for your specific needs. Get very specialized — start at the highest level, but think it through all the way down to the end user," he says.

Choices, Choices

PKI, VPN, SSA, DES, IPSec — the acronyms are as numerous as the options. But with so many choices, the results may add to the problem instead of leading to a solution. With 75 different firewalls available, and more than 50 distinct intrusion detection packages, it's easy to see some networks consist of incompatible security solutions.

In a recent IBM survey of 44,000 companies currently involved in e-business endeavors, and who have a security system in place, the lack of consistent security structure was the number two complaint. Many have purchased a variety of security software and hardware products from different vendors — each with their own product-specific processes and procedures.

The challenge, then, is to build a multidimensional, seamless network security structure, transparent to the user yet resistant to attack. "Multidimensional means that it addresses the problem from multiple angles — prevention, detection, authentication, policy, procedure, etc. But with common sense so that the users buy in and support it," says Keith Palmgren, National Security and Business Continuity Planning (BCP) Practice Manager with Sprint Paranet, a division of Sprint International. "After all, no matter what you put in place, it is the end users who actually implement the security of your network."

The good news is that by turning to an outside security specialist such as Palmgren, you can get the needed system cohesion and control, freeing up much-needed budget and human capital for use in other areas. Turnkey systems, prepackaged and administered on a subscription basis, offer an attractive security option to a manager of a patchwork network environment.

Lack of properly trained personnel is another hurdle to effective network security. A Web survey conducted by International Network Services (INS), Sunnyvale, Calif., in 1998 found that 51% of the respondents listed lack of personpower as the greatest barrier to improving network security, and 41% cited the amount of staff training required to manage the system as an obstacle.

"In general, there aren't enough people trained on the networks to adequately staff the network organizations. When you get into something that requires more expertise, such as security, that shortage is heightened," says INS Research Programs Manager Rick Blum.

For many businesses, outsourcing is the solution. According to Blum, a shortage of personpower as well as budget constraints make outsourcing an attractive option for many organizations. With outsourcing, businesses can save on the purchase of expensive equipment as well as the annual salary of a dedicated security administrator. Lawler adds that another reason turnkey security services are so appealing is that the provider can shoulder the cost of the necessary ongoing system management, support, upgrades, and so forth.

Beyond Firewalls

Firewalls are used for perimeter protection at the connecting point between the LAN and the WAN. They are on guard 24 hours per day, seven days per week, 365 days per year. That makes them one of the most popular security applications. However, a firewall strategy must include total firewall, multilevel security management with features such as:

- strong user authentication;
- high availability;
- anti-virus software intrusion detection and containment;
- Public Key Infrastructure (PKI) plus physical security; and
- Internet and remote management of the firewall.

Sprint's technical alliance with Trend Micro will

> *"One vital thing to understand is that you don't install security; you manage security. Every day your network changes slightly, and every day new threats and hacks appear. It's like the Maginot Line. Static defenses ultimately fall."*
>
> **—John Lawler,**
> **Concentric**
> **Network Corp.**

Security Becomes a Priority

A recent survey of 300 commercial U.S. companies with revenue over $100 million, from International Data Corp. (IDC), Framingham, Mass., found that half of IT executives believe the number of security threats to their organizations will increase 20% per year, and are prepared to back up their expectations with dollars. According to IDC, the worldwide Internet security software market grew to an estimated $3.1 billion in 1998. Moreover, IDC predicts that businesses will increase spending to $4.2 billion in 1999 and $7.4 billion by 2002.

Anatomy of an Effective End-to-End Security System:

- Develop a company-wide security policy (the "road map").
- Identify key resources that you need to protect.
- Set up perimeter defense (firewall).
- Cordon off sensitive areas, within the network, with least-privilege security restrictions.
- Implement strong host security across the Internet, extranets, and LANs.
- Encrypt sensitive data.
- Strongly authenticate access (i.e., digital certificate or smart card with password).
- Practice common-sense workstation security such as "need-to-know" physical access.
- Stress security education and awareness among all personnel.
- Periodically reassess security needs and resources.
- Provide 24 x 7 support.

assure a rapid response to the escalating threats posed by new and increasingly malevolent viruses. Cupertino, Calif.-based Trend Micro provides "carrier class," quality antivirus software. In addition, their relationship with Sprint assures customers that they will get a fast response to new virus threats.

"Most of the damage caused by a virus infection comes from the delay in distributing the vaccine," says Bernie Wu, Trend Micro's vice president of sales. Quoting a Reuter news report, Wu says that the Melissa virus caused $7.6 billion in damages, primarily through lost productivity, denial of service, and service outages.

"This shows that many virus containment strategies take too long to distribute and are therefore not effective enough. We issued a Melissa inoculation within four hours," says Wu.

"A firewall is really much like a sophisticated traffic cop; it detects and stops unauthorized or suspicious movement in or out of the network," says Tari Schreider, National Principal of Security for Sprint Paranet BCP. "But security is more than a firewall; it's a process. You can't just put in a firewall and think you're secure."

Written by Howard Millman (hmillman@ibm.net), who maintains, networks, and designs computer systems that help clients achieve the maximum return on their automation investment.

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Briefs

Intershop Communications is getting ready to ship Enfinity, a package of business-to-business and business-to-consumer marketing applications based on Enterprise JavaBeans and XML technologies. The software, which includes a Web-based catalog application and 75 different order-management options, typically costs at least $150,000.

Intershop: www.intershop.com

Novazen, a Boulder, Colo., maker of software that helps companies interact with their customers via the Internet, has received $20 million in venture funding from Columbia Capital, Rho Management and several other investors. Novazen plans to use the money to target new vertical markets and extend its product line. In addition to customer relationship management software, Novazen also makes electronic bill presentation and payment products.

Start-up **Visionael** of Palo Alto last week announced a version of its network management software that can be accessed from desktops running Web browsers. With Visionael 5.0, users will be able to browse information in the Visionael database and run reports via a Web browser, instead of from an expensive computer-aided design workstation. Other new Visionael 5.0 features include the enhanced discovery of network devices, an improved ability to import data from existing databases and spreadsheets, and an editing capability that helps users make their network data consistent.

Version 5.0 will ship at the end of October. Pricing starts at $50,000, depending on the number of users.

Visionael: www.visionael.com

IBM's Zisman looks beyond messaging

NetworkWorld Q&A

Mike Zisman has two jobs — he's executive vice president for strategy at Lotus and vice president of strategy for parent company IBM. His role is to examine areas where IBM and Lotus can work better together. Currently, he's spending much of his time exploring the topics of knowledge management and collaborative communications. Zisman recently shared his thoughts on these and other issues with Network World *Senior Writer Marc Songini.*

"The market is moving in more interesting directions with real-time collaboration and knowledge management."

Mike Zisman, executive vice president for strategy, IBM/Lotus

The traditional messaging and groupware markets seem to have matured. What's going to spice up this market?

The market is moving in more interesting directions with real-time collaboration and knowledge management. We've clearly solved the messaging problem — you can't live without messaging today. Now we're solving problems in the collaborative market and doing real-time messaging, and from that we get knowledge management.

What do you mean when you talk about knowledge management?

The best sound bite is from [former Hewlett-Packard CEO] Lew Platt, who said, "HP would be better off if HP knew what HP knew." Knowledge management is a whole set of technologies. There are five key ones: business intelligence; collaboration; distributed learning; knowledge discovery and mapping; and expertise location.

Technology plays a role in knowledge management but by itself it will not solve problems. For an analogy, look at the massive investment made in enterprise resource planning systems. You could step back and say it was a new technology, but every ERP implementation starts with accounting, and we've been doing that since 1960. ERP was about looking at integrating a system across technologies.

See **Zisman**, page 44

Software keeps an eye on Exchange

BY JEFF CARUSO

SEATTLE — Appliant last week began beta tests on a new version of software geared toward helping IT managers tune the performance of their Microsoft Exchange systems.

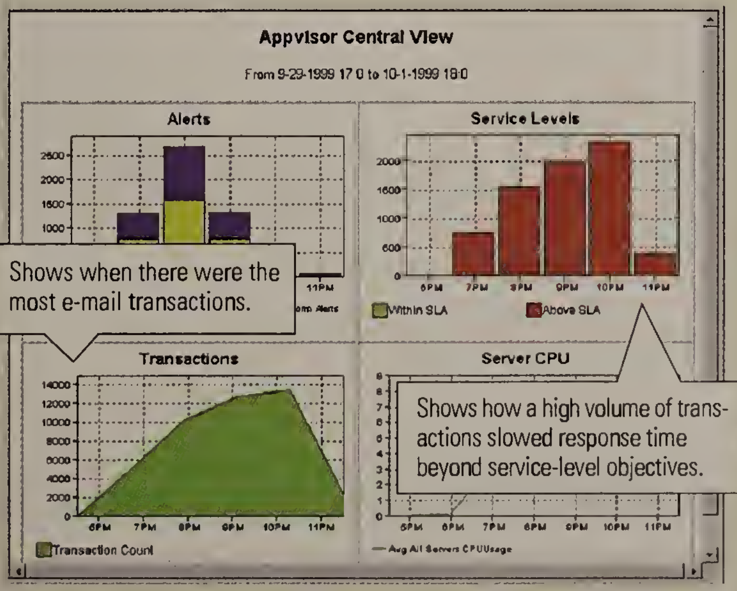
Appliant's Appvisor tracks the response time and availability of Exchange. In an announcement at the Microsoft Exchange Conference in Atlanta, Appliant said Appvisor 2.0 would be better able to recognize transactions, create a baseline of normal Exchange performance and alert IT managers when response time exceeds a preset threshold.

In addition, the company has reworked the underlying technology so Appliant can develop similar software for applications other than Exchange, such as Lotus Notes.

"Appliant has a very interesting technology for observing the behavior of your software," says Susan Aldrich, senior consultant at Patricia Seybold Group. In addition to measuring the total transit time of e-mail messages, the software can show which departments or individuals are using up bandwidth or e-mail servers, she says.

A peek at the peaks

Appliant's software gives IT managers a look at when their systems are hit hardest:



Shows when there were the most e-mail transactions.

Shows how a high volume of transactions slowed response time beyond service-level objectives.

Appvisor has components that reside on client workstations, another piece that watches the server, and a third piece to collect and correlate all the data. This setup gives the product the ability to correlate memory and I/O problems on a workstation with poor performance, says Gretchen Warner, senior product manager at Appliant.

The product works in two ways. It can give a historical perspective on how well the Exchange system has been performing over time. It can also trigger alerts to IT managers in real time when response time gets too high or utilization on the server exceeds a threshold.

The product tracks statistics specific to Exchange, such as the folders being accessed, heavy senders and receivers of messages, and the types and sizes of attachments. If an organization has an edict against sending very large attachments, the software can pick those out and alert an IT manager, Warner says.

Appvisor is priced starting at $25,000. The new version is expected to be available by year-end.

Appliant: www.appliant.com

XML tool eases data exchange over the 'Net

BY JOHN COX

MOUNTAIN VIEW, CALIF. — A new XML software product lets companies exchange data via the Internet by writing a few lines of code in a simple scripting language.

Using BizConnect, from start-up Scriptics, companies can pass data directly from order entry systems to manufacturing resource-planning applications or other back-end systems through Web documents formatted in XML.

XML is being touted as the lingua franca of the Web — representing data, as opposed to text, in a common format that can be understood by different applications. But it's hard to find tools for actually moving the data contained in XML documents between applications at different companies.

BizConnect is an attempt to create a reusable software skeleton to support XML data exchanges by using the Tcl scripting language. Tcl (pronounced "tickle") was created by Scriptics founder and CEO John Ousterhout while he was a professor of computer science at the University of California at Berkeley.

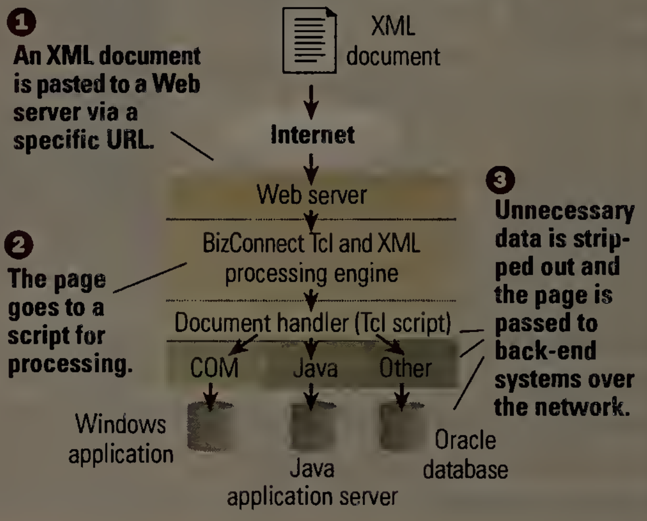
Customers can write applications in any language, then use Tcl as the glue to connect them, he says.

BizConnect has several parts. The scripting engine processes the Tcl script and reads the XML information. The engine runs on the public domain Apache Web server or Microsoft's Internet Information Server.

A developer or end user works with BizConnect Author, a graphical tool set, to create scripts called document handlers. Each script is designed for a particular type of XML page. The scripts run with the BizConnect engine and pull the data out of documents. Then document handlers use a set of interfaces, called integration points, to pass the data to other applications outside the Web server.

How Scriptics' BizConnect XML server works

BizConnect enables companies to share data by taking data from XML documents and converting it into a format that back-end applications can use.


❶
An XML document is pasted to a Web server via a specific URL.
XML document
Internet
Web server
❷
The page goes to a script for processing.
BizConnect Tcl and XML processing engine
Document handler (Tcl script)
❸
Unnecessary data is stripped out and the page is passed to back-end systems over the network.
COM
Java
Other
Windows application
Java application server
Oracle database

With the first release, BizConnect will have four interfaces: the Common Object Model (COM) interface will work with Windows applications; the Java interface will work with Java application servers that support Enterprise JavaBeans; the Oracle interface will access Oracle databases; and the fourth interface will work with legacy applications on Unix servers.

A beta version of BizConnect is available now. The final product will ship in November.

A single-user development version costs $5,000; a group development version is $12,500. Deployment licenses start at $50,000 for computer systems with up to four processors.

Scriptics: www.scriptics.com/products/bizconnect/

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Financial firms investing in Web-based customer service

BY ELLEN MESSMER

With online banking and investment trading growing apace, the financial community is taking steps to ensure that customers don't get lost in cyberspace.

At Crestar Bank, when the volume of customers' e-mail questions overwhelmed the ability of a single person to answer them quickly, the firm installed Silknet's eBusiness System server software, which scans each message for its content based on business rules. The software then routes each message to the appropriate staff specialist.

Silknet's Java-based software tracks the response to the e-mail and gives the Crestar customer service manager a bird's-eye view into the history of these e-mail questions. Silknet can also automate simple-to-answer questions, such as which Crestar banking services are available online. And Silknet goes beyond e-mail response, letting Crestar set up for customers personalized Web pages that tailor information and services to them.

> **"Our customer service does seem headed toward self-help."**
>
> Karen Davis, vice president, Crestar

In addition, the eBusiness System features what Silknet calls its "Knowledge Manager," which lets customers access information on frequently asked questions and account history. "We haven't implemented this part yet, but our customer service does seem headed toward self-help," says Karen Davis, vice president of electronic commerce at Crestar.

Davis notes that Web customer service is crucial to meet the demands of "Generation X" customers, who appear to prefer Web banking to standing in line. And while Crestar isn't disclosing exactly how much it's spending on the customer-service effort, Silknet's software typically runs to $200,000.

Investment house Rittenhouse Financial Services, which manages $17 billion in assets for firms such as Merrill Lynch, Salomon Smith Barney and Prudential, is also taking a new approach to client interaction.

Rittenhouse traditionally held 100-person conference calls with financial consultants to discuss new portfolio options. Now Rittenhouse has installed eGain's customer-service software so it can host a Web conference at rittenhousefinancial.com. Participants can "chat" in real time while PowerPoint slide presentations are being shown. The eGain software also lets Rittenhouse "take control" of clients' browsers to direct the clients to certain content.

"After the presentation is over, eGain packages up the entire session and e-

See **Financial**, page 44

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Revised IBM firewall foils spoofers, spammers

BY MARC SONGINI

RALEIGH, N.C. — IBM's latest firewall release will offer protection for multimedia applications as well as shield users from unwanted e-mail.

Among the key features in SecureWay Firewall 4.1, which runs on Windows NT and AIX servers, is support for the SOCKS V5 protocol. SOCKS V5 can be used to define security policies for dealing with Real Audio and other high-bandwidth multimedia applications being accessed outside the corporate network. SOCKS V5 can also be used to provide secure access for external users to multimedia content running on a corporate network.

IBM has added a number of features for preventing annoying e-mail, such as spam, from getting to end users. The firewall's Secure Mail Proxy technology blocks spam by checking messages to see if they have addresses that can be replied to — most spam does not. If a reply can't be made, the message is blocked.

The proxy technology also contains an algorithm that prevents spoofing — the practice of making an e-mail appear as if it came from an address other than its true point of origin. The proxy detects spoofs by checking the sending message transfer agent's IP address against the domain name of the originator. The firewall also can be configured to block relay messages that are neither from nor to a network's users and that can tie up e-mail resources.

The revised SecureWay Firewall offers network address translation support, which will allow customers to use one address outside the network to represent multiple addresses within the net. This ability makes it easier to manage security when outside users need to access internal resources, IBM says.

To speed the firewall's performance on the RS/6000, IBM has added symmetric multiprocessing support. This means that the firewall's workload can be distributed over two or more processors sharing common memory.

SecureWay Firewall 4.1 is available now and starts at $2,079. Upgrades for Version 4.0 start at $833 per user.

IBM: www.ibm.com

Zisman,
continued from page 41

Knowledge management requires the recognition that unless companies change their core processes, just throwing technologies at problems will not change things.

How does your view of knowledge management differ from, say, Microsoft's?

I'm not sure Microsoft appreciates this. I chuckled when I saw an ad in *The Wall Street Journal* for knowledge management. There was a picture of Windows and Back Office. You can call it knowledge management if you want, guys, but it's the same old stuff.

Where is the real-time collaboration market going?

The market for pure messaging peaked, and now most customers want to see messaging-based collaboration. . . . These collaboration products are doing quite well. I can instant message anyone in my company. With a browser, you can go to a Web site and click on to a meeting and all be working together. It eliminates an enormous amount of travel. The next big step is directly embedding collaboration tools in applications. We're very excited about integrating this into applications in other IBM units.

Lotus recently pulled the plug on its eSuite collection of Java-based productivity applications. Did you learn any lesson from this?

I wouldn't say we pulled the plug on it. We announced we were stabilizing it, at least for the time being. We're continuing to support customers. The lesson we learned? We were doing it in anticipation of the network computer market. However, the market did not mature as people thought it would. The network computer was depending on Java, and Java was still coming along. We're ahead of the market on this thing. We've got great stuff, and we'll pull back and wait for the network computer market.

Some people have written [the network computer market] off — I have not. ◪

More Online

- A knowledge management tutorial.
- A February interview with Zisman in which he discusses knowledge management.

DocFinder
FIND IT 5024 ON FUSION
www.nwfusion.com

Financial,
continued from page 43

mails it to the individuals," says Bill Crager, managing director for investment management at Rittenhouse.

Some insurance firms are using the Web to sell policies and process claims without ever making a phone call or signing any papers. Madison, N.J.-based Atlantic Mutual set up insurepoint.com as an insurance storefront to sell products to its customers, primarily software companies.

After submitting a Web form, the insurance applicant gets an e-mail confirmation automatically sent to his business, notifying him his application was received and giving him a password and ID. In the meantime, the Web application is routed to an insurance underwriter, who reviews the application and sends the applicant an e-mail telling him to click to a specific URL to review the insurance price terms. If the applicant agrees to the terms, he can answer "yes" and the insurance coverage is initiated.

"They can file claims this way or do a policy change," says Tom Winn, Atlantic Mutual's Webmaster. "They also get renewal notices through e-mail."

Winn says the insurepoint.com workflow and response process was designed in-house based on Allaire's Cold Fusion application server. ◪

'Net Insider . Scott Bradner

'BEST WITH . . .' IS BAD FOR YOU

All too many Web sites have buttons on them labeled something like "Best viewed with Browser X." If you press the button, you get connected to a place where you can download that browser.

There are three reasons that people put these buttons on their sites: because of business arrangements; to make a political statement; or because the site uses features only available in a particular browser. The first two reasons are mostly benign, but the third can hurt the site owner and annoy surfers who reach the site.

It has become quite common for browser vendors to cut deals with Web site operators who wind up agreeing to push a particular browser. Part of the deal is that the site puts a button on its home page that tells people reaching the site that they should be using a particular vendor's browser — a typical advertising ploy. It has also become common for Web page operators who dislike one of the major browser vendors to feature a button pushing an alternate browser on their Web sites. As long as it's just advertising, pro or con, this is fine. But it is bad for us all if the Web site designer goes beyond advertising and purposefully uses features only present in, or absent from, a particular browser.

To quote Tim Berners-Lee, the generally acknowledged creator of the Web: "Anyone who slaps a 'This page is best viewed with Browser X' label on a Web page appears to be yearning for the bad old days, before the Web, when you had very little chance of reading a document written on another computer, another word processor or another network." (*Technology Review*, July 1996).

The main purpose of standards is to ensure that users have options for products that implement the standards and that there is competition among product vendors. Any time people decide to avoid using standards-based products or to use features that are beyond what the standards have defined, they reduce the availability of products that can support their activities. In the case of Web site operators, they reduce the flexibility of site users. I fail to understand what advantage Web site operators get from making it hard for their potential customers to use their sites.

There is a Campaign for a Non-Browser Specific WWW (www.anybrowser.org), from which you can get a "Works best with any browser" button for those sites that are smart enough to understand that making it hard for customers is counterproductive.

Disclaimer: Harvard's last campaign was for a bit more than $2 billion and did not concern itself with browsers. In any case, the above observation is mine.

Bradner is a consultant with Harvard University's University Information Systems. He can be reached at sob@harvard.edu.

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e-business is about people, systems and companies connecting in completely new ways. They will be drawing information from systems that are not naturally compatible – and depending on the instant availability of that information to do what they do. It's a vast, complex, interconnected world that must be made practical, simple and easily accessible to an almost unimaginable variety of users.

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Software distribution done right

BY JEFF CARUSO

MANAGEMENT TECHNOLOGY

Users give tips on how to implement electronic software distribution tools.

With big bandwidth dropping in price and software distribution tools maturing, companies are starting to feel safe about sending out new software and updates over networks instead of via CD-ROMs.

Software distribution is one management technology that has found widespread success, and current users are eager to share tips for capitalizing on it.

With software distribution tools, corporations can prepare their PCs in less time and ensure that clients have consistent configurations. By distributing software over the Internet, some companies are reaching into homes and businesses with new services.

In general, software distribution tools consist of a central distribution server and agents installed on clients. Once a network manager tells the server which machines should receive software, the server sends the software to the agents, which in turn install the software on the target clients.

"Two years ago, what we're doing now just wouldn't have worked," says Ira Dworkin, chief technology officer for Passport New Media, a start-up in Los Angeles. The company is about to launch an Internet-based service called Your Own World, which screens Internet content for children.

To run the service, end users will need client software that takes up about 150M bytes of space on their PCs. The initial software will be packaged on CD-ROMs, but upgrades will be distributed via the Internet using a tool from Marimba.

Dworkin says that with the majority of users having 56K bit/sec modems, that's sufficient bandwidth to handle software downloads as needed.

Your Own World needs a lot of software distribution features, but Dworkin acknowledges that many companies might not have so many requirements. "If you're just going to be updating files that are 1 or 2M bytes in size once every week or so, you may not need a solution that does byte-level differencing," he says. Byte-level differencing is a bandwidth-saving technique for updating files in which only the bytes that have changed are altered.

Another feature that some tools have is the ability to pick up software downloads right where they left off, in case the connection is lost in the middle of the download. If the endstations are always connected to a LAN, this feature is unnecessary, Dworkin points out. Plus, if all downloads are behind a firewall, heavy security is probably not needed.

Distribution list

IT managers thinking about implementing automated software distribution should keep these guidelines in mind:

- **Know your requirements.** Figure out the features you need before approaching vendors, or they'll try to sell you everything from encryption and compression to byte-level differencing.
- **Get a current inventory.** Know what you have on your current PCs, because any new software distributed to them has to work with the installed hardware and software.
- **Set up a test environment.** At your central location, create a representative test network to work out all the kinks before distributing software to clients.
- **Make it user-friendly.** If your end users are nontechnical, ensure that the client side of the distribution mechanism is simple and quick.
- **Don't cut corners.** This kind of project affects everyone in your organization, so make sure you have room in the budget for properly training your IT department.

Watch out for speed bumps

On the corporate side, one of the biggest advantages of automated software distribution is that PCs can be updated rapidly, says Jim Bearce, network engineer at The Copeland Companies, an East Brunswick, N.J., group of companies that focuses on retirement planning.

Before deploying a software distribution tool from ON Technology at the beginning of the year, Bearce's organization could set up about three or four clients per week. After installing the product, the team was building between 15 and 40 machines per day, Bearce says. Plus, the clients are configured the same way, which makes any problems easier to troubleshoot.

However, that pace proved to be detrimental. Copeland cut corners in training and preparation in order to roll out about 800 clients in just more than three months. Plus, the organization "started using [the software distribution tool] in a way ON Technology really hadn't planned on," Bearce says.

The problem was that many of the endstations were remote laptops with slow connections. ON Technology's software was geared toward PCs with fixed connections to a network. "We came up with our own workarounds and ran into a couple of problems," Bearce says. Specifically, the database with software and hardware information would get corrupted under some circumstances.

ON Technology has since released a version of its ON Command CCM aimed at better updating remote users. Bearce says Copeland will continue to use the software to roll out upgrades from Windows 95 to NT.

Bearce says the best success he has had with software distribution was when he planned adequately. "Planning and testing — that should be three-fourths of your work right there, and the rollout will be very simple after that," he says.

Customization required

Western Resources uses a Tivoli tool to distribute all kinds of software, including 3270 terminal emulation software and PeopleSoft applications, to its 1,500 desktops. The electric utility company wanted to cut down on the cost of sending a technician to each desktop to install software. While the company hasn't reduced its staff, that same staff is handling two to three times as many requests as it did before the Tivoli tool was installed 18 months ago.

One requirement the company had was the customization of the software distribution tool to its own environment. "That in itself can overwhelm you," says Kevin Winters, senior manager for network control at the company.

"Tivoli's software is a little weak in logging, so you can build your own scripts to deliver the logging you want," he says. The flexibility to adapt the software is key, Winters adds.

Another factor to keep in mind is what end users will have to go through to get their software updated.

Charles Schwab recently introduced a service for active investors that uses software installed on a client. The software is distributed to the investors via CD-ROMs, but updates are sent over the Internet.

Because the software is being distributed to nontechnical users, the company wanted to ensure the software updates were easy to access, says Vincent Phillips, vice president of electronic brokerage technology at Charles Schwab.

The software is also set up to give users the option of postponing updates if they don't want their computers tied up at a particular time. Plus, Charles Schwab is trying to make sure its updates take less than one minute over a 56K bit/sec modem connection, and the company has been limiting updates to about one per month.

The biggest key to success with software distribution is "don't cut corners," says Scott Feuless, vice president of technology operations at ebaseOne, an application service provider. The company sells access to applications, and it tracks how the clients on its customers' networks are configured.

"This is a technology for a solid technical team with good resources at its disposal," he says. "Doing truly robust software distribution is a significant challenge." ◪

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Technology Update

An Inside Look at the Technologies and Standards Shaping Your Network

Ask Dr. Intranet

By Steve Blass

What does HDML stand for and what is its purpose?
Via the Internet

HDML, developed by Phone.com (formerly Unwired Planet), stands for Handheld Device Markup Language. It is used for making text portions of Web pages accessible by the mini-browsers used in handheld wireless devices. HDML served as the basis of the Wireless Access Protocol (WAP) Forum's Wireless Markup Language (WML).

A good source on HDML and WML is www.phone.com, which has protocol specifications, technical background and an HDML/WML software developers kit. Phone.com programmers say anyone with knowledge of HTML, Common Gateway Interface scripts and SQL queries should be able to write a presentation layer using HDML or WML.

To serve HDML or WML content from a Web server, you must add entries to a server's MIME configuration list. Add the MIME type "text/x-hdml" for files with hdml extensions; "text/vnd.wap.wml" for wml; and "image/bmp" for bmp.

Before choosing HDML or WML, find out what phones your wireless carrier plans to deploy. Phone.com recommends HDML to develop applications for the U.S. and Canada because most commercially deployed phones in these countries only support that language.

HDML also has nested application contexts, which are useful for developing applications that provide user input forms or require that user data be secured from other applications.

Blass is a network architect at Sprint Paranet in Houston. You can reach him at drintranet@paranet.com.

Network processors speed progress

BY TOM MEDREK

Virtually every new generation of communications equipment has been driven by advancements in integrated circuits, and once again a new class of silicon devices is promising to reshape the network business.

The new chips, called network processors, are optimized for performing communications functions, and they combine the best attributes of Reduced Instruction Set Computing (RISC) microprocessors and Application Specific Integrated Circuits (ASIC) in a single device.

RISC processors, because they are software-programmable, provide the flexibility to adapt to the rapidly evolving data communications market. However, they lack ASIC-level performance because of their generalized architectures, which are designed to support a range of applications outside communications.

ASICs solve the performance problem but can take 12 to 18 months to develop; require scarce, specialized engineering talent to implement; and have fixed functionality. Modifying an ASIC can cost six to nine months in time-to-market and, even worse, can force forklift upgrades on customers who own equipment based on out-of-date silicon.

Network processors overcome the limitations of these two approaches by combining the programmability of RISC processors with the performance of ASICs. These new devices use specialized instruction sets and hardware accelerators to optimize performance in communications applications.

At the high-performance end, network processors are typically based on a custom core, as opposed to a general-purpose processor. They also use a special set of instructions designed to very efficiently process communications functions — usually in one processor cycle.

For enterprises and service providers, the use of network processors ensures against premature product obsolescence. The rate of innovation in the communications market is accelerating while the industry converges around IP and Ethernet packets. With many of the best minds in the communications business dedicated to developing real, practical quality of service, we can expect to see a constant stream of new approaches to traffic management emerge over the next few years.

The question then becomes: Will your equipment be able to adapt? With the advent of network processors, the answer is yes.

The recent 56K bit/sec modem situation is an excellent example of the value of programmability. Some vendors shipped prestandard products that used programmable digital signal processor chips to implement their modem algorithms. Once a standard was ratified, all that was needed to bring deployed modems into compliance was a software upgrade.

Network processors also accelerate time-to-market and reduce development expenses for delivering new functions and protocols. Adding support for a new function can be quickly accomplished by simply changing software, which may run on existing equipment if architected properly.

By eliminating the need for complex ASIC design and potentially even printed circuit board design, network processors will also help further reduce product development cycles, which have already shrunk by up to 50% in recent years. This flexibility allows equipment vendors to be much more aggressive in creating and deploying new network technologies and protocols.

Another interesting industry benefit being fueled by network processors relates to the chip companies. The fact that network processors can be used in a variety of applications is encouraging semiconductor companies to address small emerging markets much earlier than they have in the past. Chip companies will be able to spread their investment costs across a wider range of markets, reducing the revenue threshold that is required to enter specific new markets.

The rate of innovation in the communications business, which is already at an all-time high, is about to accelerate even more. This will leave vendors that stick with traditional fixed-function ASICs — and the end users and service providers who buy their equipment — struggling to keep up.

Medrek is vice president of marketing at Maker Communications in Framingham, Mass. Maker is a fabless semiconductor company that designs, develops and markets high-performance, programmable network processors, development tools and application software. Medrek can be contacted at tmedrek@maker.com.

UP CLOSE

Benefits of RISC + ASIC chips = network processors

Optimized for communications functions, network processors combine the attributes of existing RISC and ASIC architectures.

RISC processors

- ▲ Programmable design adapts to evolving standards and functional needs.
- ▲ Flexible architecture allows for use in range of equipment.
- ▲ Short development cycle gets products to market quickly.
- ▼ Slow performance unsuited for high-speed systems.

+

ASICs

- ▲ Superior performance supports high network speeds.
- ▼ Single-function design limits usefulness of chip.
- ▼ Architecture cannot be modified for new standards and functions.
- ▼ Lengthy development cycles extend time to market.

=

Network processors

- ▲ Programmability protects investments for vendors, customers.
- ▲ Flexibility lets chips be used in variety of equipment, apps.
- ▲ Short development cycle quickly brings prestandard technology to market.
- ▲ High performance handles intensive operations such as voice processing.

Gearhead — inside the network machine . **Mark Gibbs**

IN TIME OF NEED, BEFRIEND THE DREADED WINDOWS REGISTRY

Of all the boogeymen in the PC world, the Windows registry is perhaps the most feared. Any time you go near the thing, whatever tool you use presents dire warnings about how, if you sneeze at the wrong time, life as you know it will cease and be replaced with something even more bizarre and inexplicable (tip o' the beanie to Douglas Adams).

The fact is that making a mistake in modifying the Windows registry is just as fatal as any of the other zillion things that you can do with Windows that will ensure you have a really, really bad day.

Perhaps the reason that everyone makes such a big fuss about the registry is that it is a relatively new feature. It is also an extremely ugly feature. It is bulky, overly complex and suffers from Windows' hideous heritage of compromised design and legacy snafus. Am I making myself clear?

Many books will tell you that the registry is a step forward because it gets rid of all of the .ini files that litter Windows systems. If that's the case, why does Gearhead have . . . let's see . . . 149 .ini files in his main Windows 98 PC? Boy, there's a step forward.

Be that as it may, let's look at what the registry is. The registry is a couple of hidden, read-only system files stored in the Windows folder (usually c:\windows). Sorry, but that's it — much less impressive than you might have expected.

The registry first appeared in its current form in Windows 95. In Windows 3.1, the registry was a database for information about Object Linking and Embedding objects.

The first component of the registry is the user.dat file, which tracks settings such as the wallpaper and color scheme you've selected, which desktop icons are being used, information about network connections and associated passwords, and the configuration of Windows Explorer. If you reboot with Explorer running, it will take you back to the last directory you were browsing using information from the registry.

The other half of the registry is the system.dat file. This stores system-specific data such as hardware classes and information about the devices in your system; plug-and-pray, er, play, information; device drivers to load at start up; and Windows and application settings.

Now here's a crucial piece of information: Every time you shut down a Windows 98 system normally (not to be confused with the rather more common shut down driven by a system freeze responded to with the big red button or three-fingered salute, which is the fate of the average user, I am told, four times every day), a copy of system.dat is made.

This copy is named system.da0 (gods help us — just what we needed, another bizarre file extension) and can be found in the c:\windows subdirectory. If you ever trash the registry, you can delete the existing system.dat and rename system.da0 to system.dat. This doesn't guarantee that everything will work right, but it may be worth trying.

Gearhead's next informational, a**-saving tidbit is that there's (ta-da) another copy of system.dat lying around! This one is named system.1st (somebody find the engineer who came up with these file extensions and have him slapped and sterilized). This copy can be found in — get this — the root of the boot drive. Before you get too excited, this is the version of system.dat of last resort — it is the original version created by the setup program when you installed Windows.

So if your hardware settings have gotten all screwed up, there you have two levels of recovery that just might save you a lot of grief. Or not. That's Windows 98 for you.

Next week, more registry fun. Extensions to gh@gibbs.com.

Network World Fusion Spotlight

News, tips and tools from our Web site

Fusion is easier to use

No more passwords, cookies or sign-up forms. Fusion just became easier to use because we've switched off our registration system. New visitors can take advantage of our growing library of resources and our extensive article archive. If you are already a Fusion user, you no longer have to worry about remembering your password if your browser hits a glitch and loses your cookie. So head online, and sample all we have to offer at www.nwfusion.com.

Open cable access

Should carriers be forced to open their cable doors to competing ISPs? In last week's Fusion Face-off between AT&T and GTE, readers chimed in with their opinions.

One reader chastised AT&T for embracing the idea in Canada but not in the U.S. Another said AT&T should unbundle its ISP from its bandwidth sales: "AT&T may be right that I can go anywhere on the Internet through its @Home service. But I have no choice but to pay for AT&T providing me an e-mail box, some Web content and a bunch of other stuff I don't need or want. Unbundle the ISP from the bandwidth. Let me choose where I get my portal, and then compete for my business."

Some say carriers blocking ISPs from their nets makes competition impossible. "ISPs aren't asking for a free ride; they are simply asking for the opportunity to compete. But if they aren't allowed, by law, to bring their own cable into your home, how can they?" a reader asks. Read GTE's and AT&T's replies are posted in our open cable access forum.

DocFinder: 4921

MCI WorldCom/Sprint

The news of the proposed merger between MCI WorldCom and Sprint has readers up in arms. One reader posted in our forum: "I really don't think this is a good idea. WorldCom has not been able to cohesively put together offerings from its own backyard. Have you ever tried to bundle MCI long-distance for your business along with UUNET Internet access along with remote intranet access? It can't be done, and then they want to put Sprint's offerings on top of that? I also think this could have a very bad effect on the public Internet as much of the bandwidth is in the hands of a company whose primary function in life is marketing, not the improvement of products and services."

Another reader, a past employee of Brooks, WorldCom and MCI WorldCom, says customer service is already lacking at WorldCom. "My customers felt very ignored," he says.

What do you think?

DocFinder: 5028

Help Desk

A network administrator asks for help with Emergency Repair Disk (ERD) creation. He installed Netscape and Windows NT on his net. But when he booted up the machine, an error displayed: "A kernel file is missing on the disk. Insert a system diskette and restart the system." He's concerned that if he creates an ERD in an NT workstation, it won't repair the server. Add your input to our Help Desk Forum.

DocFinder: 5029

Help Desk

Ron Nutter is standing by to answer your networking questions. Read his column every week on Fusion. DocFinder: 2450

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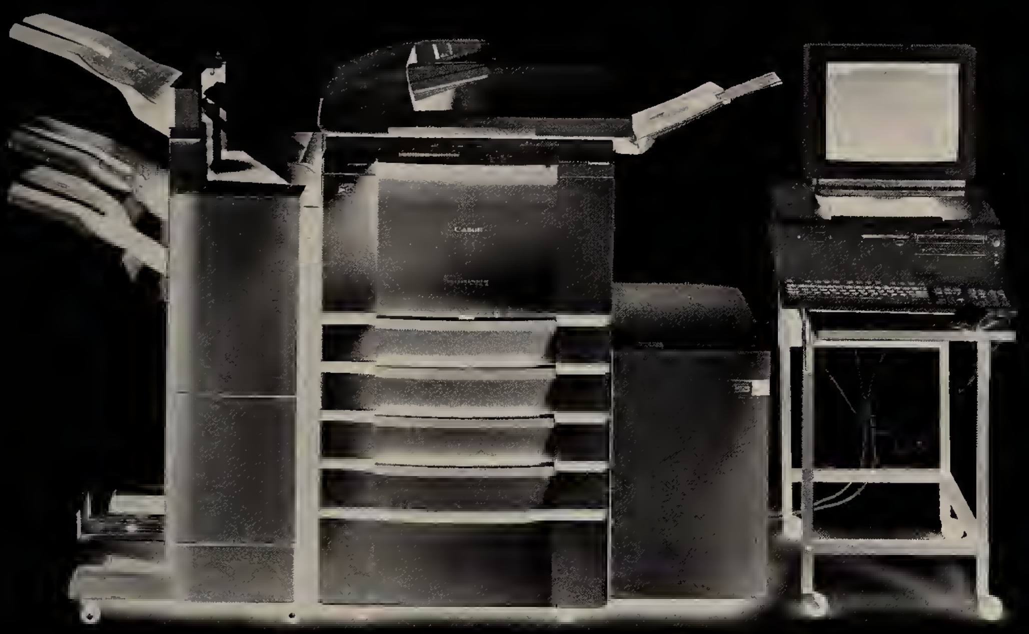

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Editorial Insights

Reluctantly in favor of a bigger MCI WorldCom

MCI WorldCom's acquisition of Sprint is not, in my opinion, a good short-term deal for customers. I would have to agree with William Kennard, Federal Communications Commission chairman, on that.

There is too much product and network overlap (to say nothing of the fact that MCI WorldCom has yet to properly integrate people and assets from earlier acquisitions and this takeover will simply compound existing problems for you).

So rather than this marriage resulting in one plus one equaling three — which can happen with a truly complementary marriage — this acquisition is like one plus one equaling one and five-eighths. What MCI WorldCom gains is size and a little scope. What the industry loses is pressure on carriers to innovate and one-up each other in areas such as customer service.

But while I'm not in favor of this particular acquisition, I think it was inevitable. Market forces dictate this kind of consolidation, and we will see more. The market simply cannot sustain seven or eight giant general-purpose long-distance carriers, especially with prices eroding the way they are.

While there are only three major long-haul carries today, a bevy of powerful companies are knocking on the door — Bell Atlantic (which swallowed Nynex), BellSouth, Southwestern Bell (which merged with Pacific Telesis and Ameritech) and US West (which will merge with Qwest pending regulatory approval).

Interexchange traffic is growing but not at a rate that would sustain the traditional Big Three AND all the newcomers, many of which will have compelling stories to sell. Even the heady growth in Internet traffic will not be enough to fill the pipes these firms will put in the ground.

Said another way, if the wide-area business was an apple, how many companies could that apple feed? It isn't in any of our interests to see 10 competitors fight over slivers. It's better to have solid competition among a small group. Fortunately, free markets have a tendency of sorting that out on their own.

When the smoke clears five years from now, I would guess we'll have two or three full-service, end-to-end carriers and a few fringe players.

Despite the short-term pain that will result from the MCI WorldCom acquisition of Sprint, I think this is an inevitable process that will benefit you long term.

— John Dix
jdix@nww.com

Message Queue

ADD SEXISM TO AGEISM

I thoroughly enjoyed Daniel Briere and Christine Heckart's column "Looking Beyond Nose Rings and Purple Hair" (Sept. 13, page 46). It summed up most of the frustrations of the over-40 tech worker quite well.

There are three of us in my tech services department. Our greatest frustration is having to correct the errors made by our very young colleagues, who don't know or understand anything prior to Windows 98. It's bad enough having to clean up after them; it's infuriating to see them get all of the plum assignments and, consequently, most of the accolades.

The only thing worse than being an over-40 IT worker is being an over-40 female IT worker. I have been in the IT business since the days of paper tape and punch cards. I wish I had a dollar for every time I've had someone argue with me over some technical concept, only to have that person fall into line the minute I put one of my 20-something male subordinates on the phone with instructions to repeat exactly what I said.

In my "more years than I care to count," I have pulled cable through ceiling and under floors. I've supervised mainframe and client/server installations. Yet I'm still the last one assigned to anything technical, and the first one called when there is something clerical to be done. I have to campaign for every choice assignment, and yet I've always gotten good marks on every project I've completed. Go figure.

I wonder how many other female techs have this problem?

Susan Bieberfeld
Hatboro, Pa.

BIG BLUE HUBRIS

Regarding "IBM net gear set to go to Cisco" (Sept. 6, page 1):

Historically, the biggest problem that faced IBM's Networking Hardware Division (NHD) was the incredible hubris that permeated IBM's management. They believed that IBM was a telecom company because for years they had sold billions of dollars worth of terminals, controllers and front-end processors.

None of these are telecom devices. They are mainframe access products and represented pull-through sales from the mainframes. Unfortunately, IBM's management did not understand this simple fact. Combined with their lack of understanding of the telecom market in general, management made some disastrous marketing decisions (selling modems, buying Rolm, not buying Cisco when they had the chance, etc.).

By the time James Vanderslice took over the helm a few years ago, NHD had no (or negative) market identity, a negligible sales force and sales support, no story to tell and no way to tell its story even if it had one. The Cisco juggernaut had gathered so much momentum, the best IBM could do was fight a rear-guard action. But there was never any visible effort to turn NHD into a truly entrepreneurial enterprise with an identity separate from IBM's. NHD was never fully engaged in the battle.

IBM decided to fight Cisco by having a superior price/performance ratio. And at the same time that Cisco was expanding its sales force, IBM was reducing its network sales force to further concentrate on external channels and cut costs. IBM ended up with a superior price/performance ratio with no sales or marketing to support the products.

Without knowing it, IBM's management has answered the classical question, "If pride goest before a fall, what must hubris precede?" There's a lesson here for every executive in the high-tech industry.

Chip Jarnagin
President
NSync Solutions
Dallas

ORGAN AUCTION

Regarding Mark Gibbs' "Backspin" column on the auctioning of human organs on the Internet (Sept. 20, page 78):

Selling body organs to the highest bidder isn't a "victimless crime." Making organs available only to those wealthy enough to buy them makes victims out of those without the means.

Doug Reaves
Fairfax, Vt.

Send letters to nwnews@nww.com or John Gallant, editorial director, Network World, *161 Worcester Road, Framingham, MA 01701. Please include phone number and address for verification.*

More Online

- Letters about organ auctions and other topics.

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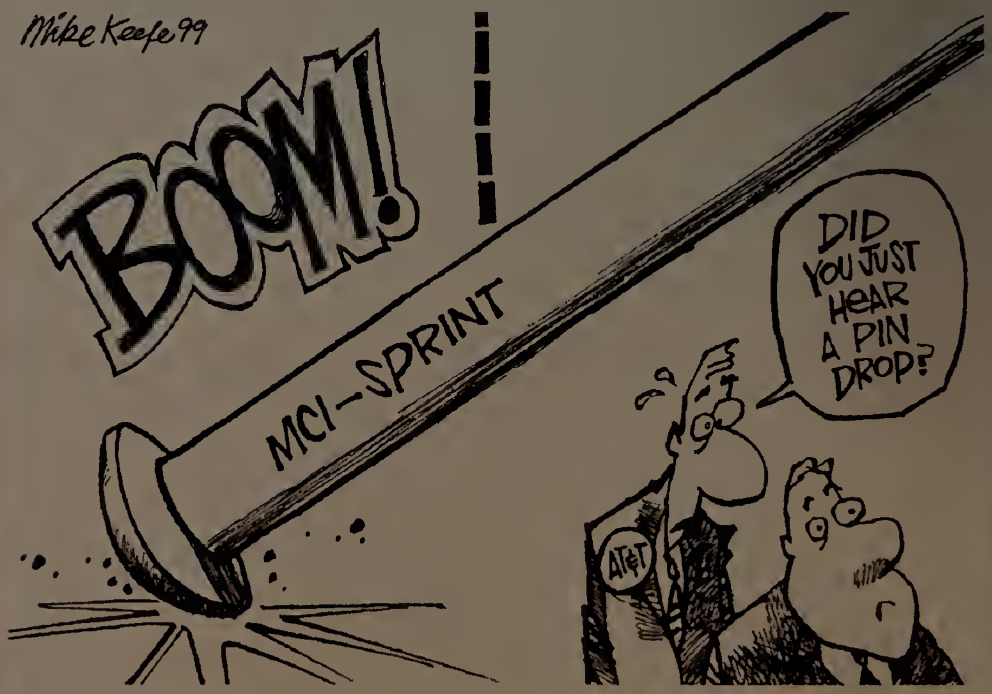


Management Mode . Jeff Shapiro

HOW MUCH IS THE INTERNET WORTH TO YOU?

At the recent NetWorld+Interop '99 Atlanta, a panel of columnists from this publication cheerfully debated the future of the network industry. Yours truly wasn't on the panel, but I sat in the audience as some of the brightest minds around constructed (and demolished) visions of things to come.

A popular topic was the future of the Internet. One panelist opined that the 'Net will soon collapse into a constellation of individual service and content providers. Another posited that the Internet will be many times faster than it is now and free, or virtually free.

My viewpoint is a little more complicated than that. I believe that within the next two years the Internet will change from the flat model of pricing for access only to a metered model of pricing by the data packet. The packet will probably be based on ATM cells of 53 bytes, and each packet will cost around .00000025 cents (just under three-millionths of a penny). If you move 20G bytes of data per month, it will cost you around $50 for your service. Some ISPs may charge a minimum amount if you're a really light user.

Why the change? Because the Internet is in big trouble right now, and it's going to take a lot of money to fix it. The Internet's network access points (NAP) are breaking down under the stress of daily peak traffic. The remedy so far has been to add additional NAPs and route between them, but this won't work anymore. The routing tables have become so complex that one simple error can cripple an entire region of the country, and a single hacker with advanced tools can cause massive disruptions anywhere he chooses.

If the Internet is to survive, it will have to change its basic nature. The distributed, peer-to-peer universe will have to give way to a more structured, centrally managed system that maintains fast, reliable access for everyone and has the power and control to act against intrusion. This will require many changes, and a lot of time and very sophisticated, expensive equipment. The only way to pay for this will be to make users pay their fair share based on usage.

Home users aren't consuming networkwide resources when they step away for a cup of coffee, so why charge them for it? On the other side of the coin, why shouldn't really high-volume traffic users such as Microsoft and *USA Today* pay proportionally for their strain on Internet resources? Web sites with variable traffic, such as The Weather Channel, which sees its hits increase by the hundreds of thousands when a hurricane threatens, shouldn't have to pay for the peak traffic when it isn't using peak resources. Only a metered model accounts for this variability.

We have three choices: Do nothing and accept a deteriorating environment; keep the flat model and increase prices by 20% to 30%; or adopt a metered pricing model. Speaking for myself, I'd rather pay for my bits as I use them. How do you feel? Drop me an e-mail and cast your vote.

Shapiro is district technology coordinator for Kingsport City Schools in Tennessee. He can be reached at jshapiro@kpt.k12.tn.us.

Above the Cloud . James Kobielus

INSTANT MESSAGING'S DUAL ROLE MAY PLAY WELL IN ENTERPRISE

It's easy to underestimate and overestimate the importance of instant messaging to enterprises.

Enterprise networks have not yet formally embraced instant messaging in great numbers because of the service's consumer orientation and the dearth of enterprise-grade products. But something interesting is brewing in instant messaging technology that may have a major impact on enterprise networks over the next several years.

Instant messaging is evolving to play dual roles: an end-user application and a behind-the-scenes middleware service. Instant messaging is an end-user application in its widespread role as a medium for person-to-person communications, per its traditional positioning as one of a spectrum of tightly linked synchronous collaboration services.

However, instant messaging is also middleware in the way it's being adapted to play a much broader role in real-time application-to-person or application-to-application messaging. Instant messaging is beginning to serve as the basis for rudimentary, lightweight message-oriented middleware (MOM)-like functionality in portal environments. Portals are implementing instant messaging as a tool for delivering real-time, asynchronous notifications of events in their service environments (such as new mail, calendar items and news stories). Portals are transforming the Internet into a broad "event canvas" in which downstream clients can receive alerts and take automatic response actions.

This trend ties into another: the computing industry's shift away from tightly coupled computing models and toward loosely coupled, platform-independent, message-oriented distributed architectures. We are in the midst of a broad decline in platforms' reliance on remote procedure calls and other object technologies that bind distributed services tightly to one another.

We can see this dual role — application and middleware — most clearly in the way portals are beginning to use instant messaging to deliver a capability that has heretofore been lacking from Web mail services: the ability to notify users immediately when they receive new mail. Traditionally, browser-based Web mail users have had to explicitly navigate to their in-boxes to see if they have mail, whereas enterprise e-mail systems such as Lotus Domino, Microsoft Exchange and Novell GroupWise generally alert users about new mail immediately.

Yahoo, for example, delivers new-mail notifications by integrating its Yahoo Messenger service with its portal-based My Yahoo personalization feature. Subscribers who use My Yahoo and Yahoo Messenger can set up the former to automatically send the latter alerts when new Yahoo mail or meeting requests hit the portal or when a user's stocks cross various price thresholds. The content of Yahoo's alerts pops up in message windows on a user's desktop and is inserted into the appropriate tabbed pages in the offline Yahoo Messenger client.

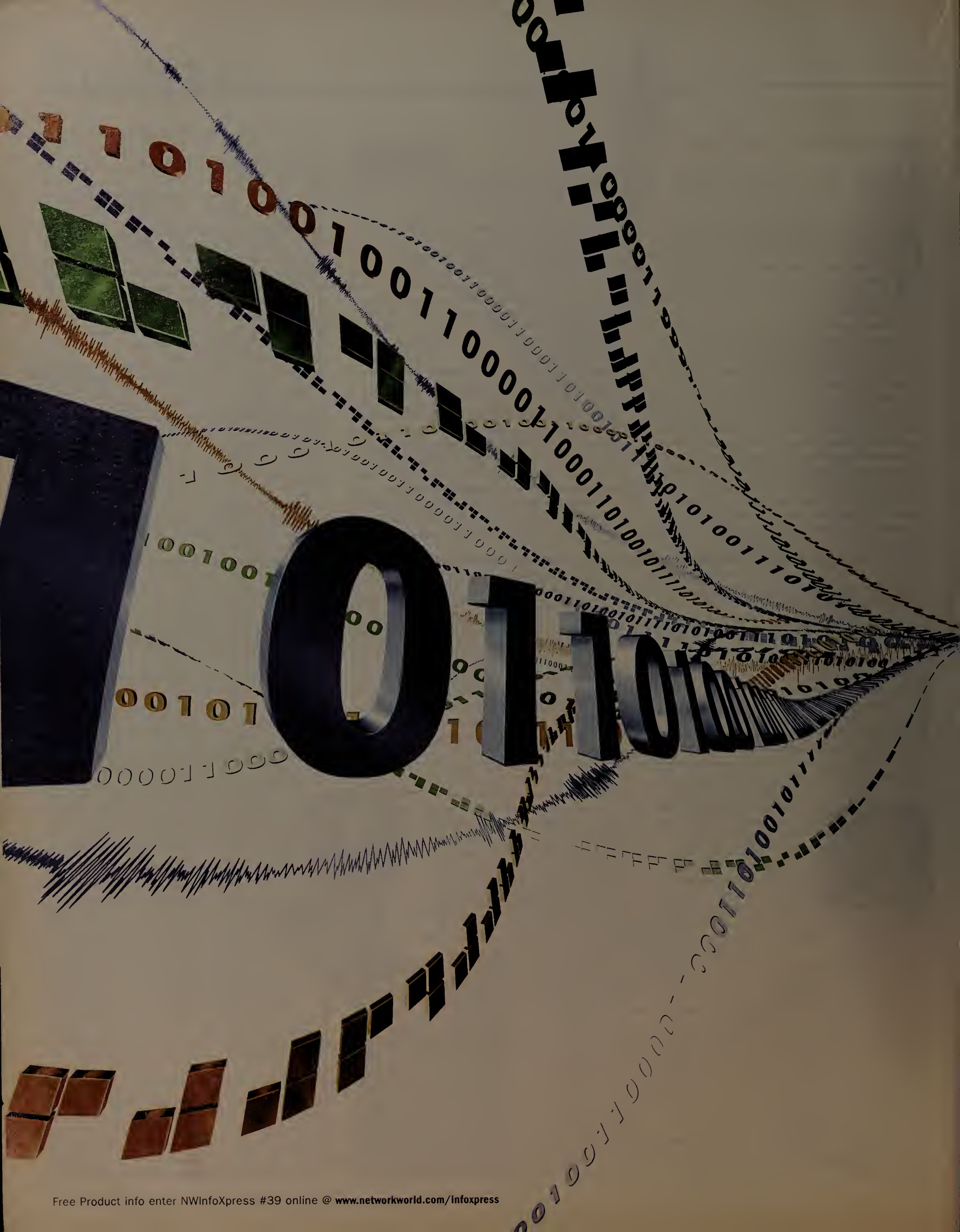
Microsoft is doing something very similar, using its MSN Messenger Service to integrate its portal-based HotMail Web mail offering more tightly with its Outlook Express messaging client. It's only a matter of time before we see instant messaging enter the mainstream of corporate networking as a widespread application and a middleware service. It may enter first in conjunction with Web mail, which previously has been relegated to the sidelines of corporate networking due to performance, interface and functionality deficiencies (including a lack of automatic new-mail notifications). Or instant messaging may enter in the form of intranet and extranet portals that include collaboration, transaction and publishing services.

FRANCIS BLAKE

Indeed, instant messaging has already entered the corporate world through much the same grass-roots process by which individual users brought personal computers, cellular phones and the Web into the corporate world. Users play with it on the side, come to depend on it and demand it from their companies.

Instant messaging is too young a technology and hasn't decided what it wants to be when it grows up. But that shouldn't stop enterprises from thinking ahead to the day, perhaps two to three years from now, when it matures into an enterprise-grade service.

Kobielus is an Alexandria, Va.-based analyst with The Burton Group, an IT advisory service that provides in-depth technology analysis for network planners. He can be reached at (703) 924-6224 or jkobielus@tbg.com. This column draws on research for an upcoming Burton Group report on instant messaging. The opinions expressed are his own.



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IN SEARCH OF AN STRA

University of Pennsylvania is looking for alternatives to its enormous modem pool.

BY TIM GREENE

The University of Pennsylvania has a problem with its remote access network: it is too popular.

With more and more students, professors and administrators tapping in to the campus enterprise network when they work at home or travel, Penn's $1.5 million annual remote access costs are constantly rising, and users are clamoring for improved services.

And like many enterprises that are running giant modem pools, Penn is considering a higher-speed, lower-cost alternative: a form of Internet virtual private network that supports digital subscriber line (DSL) and cable modems.

The school will announce this week its plans to curb use of its current 1,100-modem, direct-dial network and start weaning users over to an outsourced VPN it hopes to put in place by 2002.

While the planned VPN will offer better service, the decision is also being driven by money. "Our problems are more financial than technical," says Deke Kassabian, technical director of network engineering at the university.

Kassabian is well aware of the network's shortcomings.

1. Demand is outstripping bandwidth.

In a university community of 40,000 end users, about 15,000 students, faculty and administrators are authorized to use the school's remote access service regularly, and they log an average of 30,000 calls per day. Even with user online time limits, users still get busy signals between the peak hours — from 5 p.m. to 10 p.m.

2. Costs are rising.

This year, demand grew so much that the school had to add 180 new access lines, which means additional space for the modems, higher air-conditioning bills to keep them cool, and more staff time to monitor and maintain the gear.

> **"Much of what we're talking about makes more and more use of the Internet."**
>
> Deke Kassabian, technical director of engineering, University of Pennsylvania

3. The existing gear is aging.

Remote users dial in to Total Control remote access servers made by 3Com, formerly U.S. Robotics. Even though the staff is comfortable with the gear, the equipment has its drawbacks. The modems support a top speed of only 33.6K bit/sec, and they can't handle faster connections such as ISDN, DSL or cable modems. A total control upgrades costs too much.

4. Users have to pay long-distance charges.

When users dial in from outside the local calling area, they have to pay the long-distance charge themselves. There is no 800 number, and all the modem pools are located on campus.

Kassabian points out that despite all the problems, demand has increased every year since Penn set up its campus network, called PennNet, in 1985. Back in those days, just a few users dialing in to host computers made up the entire remote access network.

Remote access has been growing ever since, with most users now dialing in directly to remote access servers. They set up PPP sessions for the most part, but some still use plain-text, command-line-interface connections.

Users dial in for a variety of reasons and applications, including e-mail access; access to Web servers to reach databases; access to university financial and related information systems; and Internet access.

Kassabian says the current situation is less than ideal because users tend to call in from three different states — Pennsylvania, New Jersey and Delaware — racking up large personal phone bills. It gets even more costly when professors, administrators or students travel around the country to academic conferences.

The school would like to do something about that problem, but installing modem pools at remote locations so more users could access PennNet via local calls, or setting up 800 numbers, would cost too much.

Kassabian says he'd love to upgrade to a faster technology, but again, cost is the issue. For example, it costs half as much for the school to buy individual analog phone lines to feed the modem pools than it would to trunk the lines in on digital T-1 circuits. Because the school orders more than 30,000-40,000 Centrex lines from Bell Atlantic, it gets a good deal on single phone lines for the modem pool, says Mike Palladino, executive director of Information Systems and Computing Networking at Penn.

T-1s are required to support 56K bit/sec modems, which need one end of the connection to be digital in order to work. Converting the phone signal from analog to digital restricts modem speeds to 33.6K bit/sec.

Primary Rate Interface ISDN trunks that would support 128K bit/sec ISDN access would cost even more, Kassabian says.

Another problem with the existing system is that users don't pay direct fees to access the remote access service, and there's no chargeback mechanism in place to assess individual departments for their usage of network resources.

Funding for remote access comes from a port fee users pay to connect their PCs directly into the on-campus Ethernet network. Because some users — including most students — don't have an on-campus workstation, they get to use the remote access network without paying.

As a result, a fraction of the users are footing the bill for everyone. And those who pay get charged the same amount regardless of how much or how little they dial in.

"Funding from these indirect sources does not increase with increased use, so we are victims of our success," Kassabian says.

All that is about to change. In fact, a plan to transition to a VPN will be announced this week. The plan calls for charging each remote user an access fee starting next July. The fee has not been set yet, but it will be high enough to discourage people from using Penn simply as an inexpensive Internet service provider. "I'm not going to overprice it, but some people here thought I should start out with a nominal fee. Well, if I start out with a nominal fee, no one will migrate off," Palladino says.

For example, a $150 remote access fee combined with restricted access between 6 p.m. and midnight and the 33.6K bit/sec modem speeds will likely encourage pure Web surfers to sign up with an ISP.

EXIT
TEGY

Penn's Deke Kassabian is planning to wean users off of the remote access network and onto an outsourced VPN.

"That's the whole point — make it a little unattractive and make the price high enough so they deliberately make a choice to switch to an ISP," Palladino says.

When remote users dial in, 78% of them go out onto the Internet first rather than tap into campus resources. Some of that is legitimate, university-related Internet use, but "I've got to believe half of it is outside traffic and nothing to do with work," Palladino says.

Penn will also stop adding extra phone lines and modems even though demand is increasing. That will mean users will face busy signals more often. It also means that during crunch times, the length of sessions will be more restricted than they are now. Currently, peak-hour connections are cut off after an hour; that may drop to 45 minutes, Palladino says.

That should encourage people to use the network only as necessary, he says.

He expects some backlash from students who may think remote access is paid for by a technology fee that is already part of their bill.

To replace dial-up, the school is setting up a network called University City Connect, an alliance of ISPs that will tunnel Penn traffic to the school network.

So rather than pay a fee, remote users will buy an Internet account with a participating ISP. The connection can be by modem, ISDN, cable modem, DSL or whatever link the ISP supports.

Remote PCs will use standard PPP communications software to connect with the ISP. That way, the school does not have to worry about distributing and administering remote clients.

But traffic will be protected as it crosses the Internet. Through ISP alliances, an ISP will know to encrypt packets bound for PennNet using Layer 2 Tunneling Protocol (L2TP), which secures data as it crosses the Internet. A tunnel server at PennNet will terminate the tunnels, and the school will authenticate users.

"I hope L2TP will be pretty common in two years. We'll say to service providers, 'We do it. Do you do it? If you do, we'll peer with you, and off we go,' " Palladino says.

Penn is currently shopping around, looking for specific ISPs within 50 miles of Philadelphia that will support the scheme technically. The names of ISPs that comply will be added to a preferred-vendor list and distributed to Penn remote access users.

Part of the specifications calls for the ISPs to directly route traffic to the university over the ISPs' private backbones without sending it out onto the public Internet. "That way the traffic doesn't travel all around the world to get here," Palladino says.

The school will probably enlist just one national ISP to tunnel in traffic from traveling users, Palladino says. The transition has been in the making for some time, but planners wanted to make sure the technology was mature enough to handle it. And the school will embrace the Internet more as time goes by.

"Much of what we're talking about makes more and more use of the Internet. We see ourselves doing video and voice traffic, and this is consistent with the way we see remote access going," Kassabian says.

Tim Greene is a senior editor at Network World. *He can be reached at tgreene@nww.com*

GETTING RAS RIGHT FOR YOUR NETWORK

Tests show pros and cons of NT-based RAS cards vs. lower-end dedicated RAS servers.

BY JASON VAN CLEVE

Can multimodem adapter cards that plug into standard PC servers running Windows NT really be a low-cost alternative to dedicated remote access concentrators?

Port-for-port, server cards can cost as little as half the price of modular remote access devices — but can they really do the job in a real-world network? When *Network World's* Remote Access Buyer's Guide (*NW,* March 29, page 43) turned up six of these add-in boards as options for companies looking for a cost-effective way to offer remote access, we decided to see how these cards stack up against their chassis-based competition in terms of ease of use, scalability, manageability, security and advanced features.

We tested a 23-user remote access server card — Brooktrout Technology's Instant RAS AnyCall IRAS-24A remote access card — and a fully loaded 24-user dedicated remote access concentrator — 3Com's SuperStack II Remote Access System 1500.

What we learned from these tests was that even though 3Com's SuperStack 1500 has a much more robust management and security feature set, Brooktrout's IRAS-24A server card surpassed 3Com's device both in terms of its ability to scale and its overall ease of use.

Our tests also suggest that these RAS cards may be the better-performing buy (see story, page 62). However, since the Brooktrout card uses a Primary Rate Interface connection and the 3Com box uses multiple analog connections to the local PBX, we cannot conclusively say whether the performance differences were due to the products themselves, or rather, to how they were deployed according to the manufacturer's specifications. We did attempt to get a RAS concentrator that was directly comparable to the IRAS-24A from vendors including Lucent, Intel, MultiTech Systems and Perle Systems. However, these vendors declined to participate in the test.

Getting started

Brooktrout's IRAS-24A fits into any Intel-based server that has an open PCI slot. We installed ours in a brand-new NT 4.0 primary domain controller. A patch is also available from Brooktrout that will allow users to install these cards inside a backup domain controller.

Once the card was installed, Brooktrout's setup program helped us create 23 new communication port devices. We then installed modem drivers and binding NT RAS services to each new communication port device.

It's a good thing installation went smoothly, however, since Brooktrout's diagnostic and troubleshooting tools seemed scant to us. For example, there is no direct command-line interface for modem-by-modem checking, nor are there graphical tools for troubleshooting configuration problems.

Defining what RAS really means today

With a maturing RAS market, vendors are working to one-up the competition in terms of features. Our tests showed that dedicated remote access concentrators like the 3Com SuperStack II Remote Access System 1500, outpaced NT-based RAS cards like the Brooktrout Instant RAS AnyCall IRAS-24A in the features arena. Below is a list of these advanced RAS capabilities and what they can do for your network.

- **Client spoofing** A service that suspends/resumes line connection based on data transmission needs.
- **LAN-to-LAN Routing** Technology that allows users to manage bandwidth by supporting various on-demand, timed and continuous connections.
- **IP-on-Demand** A service that opens/transmits/closes data to WAN links based on network demands.
- **IP Terminal Server** Software that provides network access for remote dumb terminals.
- **NCSI Dial-out** A feature that allows special connections to Bulletin Board Systems and Internet services like Compuserve.
- **Network Address Translation** Technology that disguises all internal IP identities from the Internet.
- **Packet Filters** A service that allows/denies entry into LAN based on packet IP address.
- **Port Address Translation** Technology that disguises all internal port identities from Internet.
- **Telnet Dial-out** A service that allows LAN clients to share modems via a simulated direct connection.

Because IRAS-24A works with servers running NT Server, managing the card once it is up and running is relatively simple for those who already have NT networks. The prepackaged NT remote access tools, such as Microsoft's Remote Access Admin utility, are adequate for most management tasks.

Installing 3Com's SuperStack 1500 is as simple as plugging it in. We found the setup process relatively straightforward, but we did experience several timeout errors while saving configuration changes. This kept us second-guessing the effectiveness of the graphical user interface. Fortunately, we were able to troubleshoot using the command-line interface. We also encountered a few problems involving dial-in client configuration, but we were able to work through these with 3Com's technical support.

3Com provides three ways to administer the SuperStack 1500. You can use a command-line interface using a local console port; manage it remotely using telnet via an Ethernet port; or use the Transcend Remote Access Manager (TRAM) software that ships in the box. TRAM — 3Com's GUI — was of little help in configuration or management, especially when we tried to initially set up the product. We managed most of the device's special features from the command line and relied heavily on documentation. The full-featured command-line interface proved to be an invaluable troubleshooting tool when the GUI simply wasn't enough.

As with many of the management tools that come bundled with RAS

Continued on page 62

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Continued from page 60

devices, 3Com's TRAM is able to defer responsibilities such as user and session management and accounting services to a standards-based Remote Authentication Dial-In User Service (RADIUS) server.

Documentation for both products was adequate, but we did encounter some issues in finding the information we really needed. 3Com provided a voluminous amount of information on CD-ROM, but we had trouble pinpointing key configuration details. Brooktrout, while providing enough information on the product itself, appears all too ready to rely on users' NT expertise to manage these cards.

Grow with the flow

At first glance, the Brooktrout and 3Com products seem comparably scaled. Brooktrout's IRAS-24A supports 23 analog connections, and 3Com's fully loaded SuperStack 1500 device supports up to 24 users. However, the two products are designed for companies growing at different paces.

Brooktrout's strength lies in its ability to quickly scale upward. You can install multiple cards in a single system depending on the number of PCI slots available in a host server. You can plug as many as four Brooktrout cards into a single NT server for a total of 92 simultaneous analog connections. Brooktrout's IRAS-24A can build an NT box into an enterprise-class RAS server.

3Com's product, on the other hand, is geared toward slower growth. The company's modular approach is suited for sites that aren't ready to expand by 23 remote access connections at a time. Instead, the SuperStack 1500 scales from four to 24 users in increments of four analog connections. The SuperStack 1500 supports analog and ISDN dial-in clients, as well as LAN-to-LAN and LAN-to-ISP services.

In the end, though, 3Com's SuperStack 1500 simply doesn't scale as high as Brooktrout's IRAS-24A.

Reliable, secure access

One of the cost-saving advantages of Brooktrout's IRAS-24A is that you can add remote access services to the same NT server that hosts your other network services. However, if the Brooktrout RAS card fails or requires maintenance, all services would then be unavailable. The Brooktrout card is not hot-swappable and therefore requires that the entire server be shut down for RAS maintenance. You could lower your risk of downtime by dedicating an NT server to remote access, but that will cut into any cost savings you might have been looking for with this RAS deployment option.

By contrast, 3Com's stand-alone SuperStack 1500 offers several levels of fault tolerance. The device includes hot-swappable expansion units and replaceable ISDN and analog modules. Additionally, all powered expansion units continue to communicate if one (or more) module experiences a power outage. The only fault-tolerance hole in the SuperStack 1500 server is that it lacks a redundant power supply.

In terms of security and management features, Brooktrout has the basics covered but lacks advanced functions.

Because Brooktrout plugs into NT's Remote Access Services, it is tied to the security and management measures the operating system offers. Those services include callback security, NT user authentication, Password Authentication Protocol (PAP)/Challenge Handshake Authentication Protocol

Continued on page 64

NetResults

Windows NT-based RAS cards: Instant RAS AnyCall IRAS-24A PRI-PCI

Brooktrout Technology
(603) 898-1800
www.brooktrout.com/pages/product_info/pi_data_wan/iras_24a.html
$6,495

Pros

- ▲ Impressive throughput
- ▲ Uses Windows NT configuration and management tools
- ▲ Scalable to 92 user connections

Cons

- ▼ Cards are not hot-swappable
- ▼ Can't replace individual modem ports
- ▼ No advanced features

Dedicated remote access concentrator: SuperStack II Remote Access System 1500

3Com
(800) 638-3266
www.3com.com/carrier/nsd/products/rapd/ssii/
[$2990 for base module and 4-port I/O card]

Pros

- ▲ Feature rich
- ▲ Hot-swappable expansion units
- ▲ Replaceable modules

Cons

- ▼ No redundant power supply

THE PERFORMANCE PICTURE

When you are talking about connecting remote clients to a corporate network, high performance is an essential feature in any remote access server. For this article, we designed our performance tests to measure overall throughput — how efficiently these two devices send data to and receive data from multiple asynchronous clients.

However, we were unable to conduct identical performance tests, since Brooktrout Technology's Instant RAS AnyCall IRAS-24A and 3Com's SuperStack 1500 rely on two entirely different network technologies on the back end. IRAS-24A uses a single channelized digital connection to the local PBX, while 3Com's stand-alone SuperStack 1500 uses individual analog devices.

With the deployment choices laid out clearly on the table, we continued to measure the overall throughput of these devices using the networking technologies specified by the respective vendors. And the results seem to indicate that the Brooktrout cards give you the best bang for your remote access buck.

Surprisingly, Brooktrout managed to accommodate nearly double the throughput of 3Com's SuperStack 1500. That's not to say that 3Com's device is slow, however. In fact, SuperStack 1500 performed on par with the majority of the enterprise-class remote access servers we tested in our Remote Access Buyer's Guide in March.

IRAS-24A's average download throughput with 12 clients was a blazingly fast 91.1K bit/sec, while SuperStack 1500's average upload throughput with 12 clients was 49.9K bit/second. Average upload throughput figures were higher, as we expected. Those numbers came in at 110.2K and 63.7K bit/sec for IRAS-24A and SuperStack 1500, respectively. Throughput values for both products remained constant while adding additional clients up to the 12-client level.

The test bed

We installed Brooktrout's IRAS-24A server card on an NEC Direction SPB 450-MHz Pentium II server with 128M bytes of RAM, running Windows NT Server 4.0 with Service Pack 4. 3Com's SuperStack 1500 did not require an additional server platform.

Our FTP server was a Dell Dimension XPS Pro 200n with a 200-MHz Pentium Pro processor and 64M bytes of RAM running Windows NT Server 4.0 with Service Pack 4 and Internet Information Server 4.0.

Our clients were 12 Dell OptiPlex PCs with 166-MHz Pentium processors and 32M bytes of RAM. We connected each dial-up client via modem pool using 33.6K bit/sec external modems housed in a 3Com MP/16 V.34 Total Control modem pool. We used Windows 95's dial-up networking utility and PPP to dial in to our on-site Lucent Definity G3I PBX. From the PBX to the RAS servers we used two different network technologies. Brooktrout's IRAS-24A connected to the PBX via one ISDN Primary Rate Interface line. 3Com's SuperStack 1500 used 12 standard analog telephone connections.

We created a test script that opened a DOS window on each client, loaded the file transfer protocol program supplied with Windows 95, and typed the commands needed to transfer five 32K-byte test files to and from a test server. The file types include a vector-graphic file, a word-processing file, an Intel executable, a random-number data file and a multidata type mixture file. We measured throughput at each client using the statistics provided in the FTP program, which ignores the transmission of FTP commands in its calculations.

First, we established 12 simultaneous dial-in connections. Then we initiated FTP transfers with a single client and increased the size of the group in one-client increments up to 12 clients. We ran each test three times and averaged the results. If calls were dropped, we reran the test until we completed three successful passes.

— Jason Van Cleve

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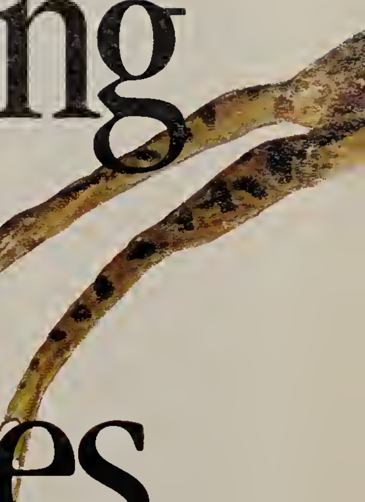

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Continued from page 62

(CHAP) encryption, and some multilink connectivity. Brooktrout bundles its NetAccess Remote Access Manager Administrator and Port Manager with its server card. The pair provides some additional services, such as a RAS session manager; port usage, monitoring and reporting; and Access Control List security.

Despite all these options, security is still a weak link for the IRAS-24A cards. Because Brooktrout's IRAS-24A is installed on a primary domain controller or a backup domain controller, you may inadvertently give all dial-in clients "log on locally" rights to the network. If a few permissions were to be configured improperly, IRAS-24A could create a security breach.

Since Brooktrout relies on NT RAS for user authentication, it doesn't allow you to defer user authentication responsibilities to third-party servers in order to increase the security of the overall service.

3Com's SuperStack 1500 is feature-rich by comparison (see graphic, page 60). Advanced management functions include a Dynamic Host Configuration Protocol (DHCP) server support for IP address management for remote clients, and SNMP support, so the SuperStack 1500 can plug into larger-scale systems management platforms. Advanced security features include client spoofing, which allows the RAS box to suspend connections and resume them as needed, and packet filtering.

More Online DocFinder: 5023

- Read a discussion of the TSB-38 modem testing standard
- See how other remote access servers and cards stack up against each other in the Network World Remote Access Interactive Buyer's Guide
- Get the details of Microsoft's efforts to beef up RAS support in its Windows NT/2000 platform.

We feel Brooktrout's IRAS-24A product is well suited for sites needing many dial-in clients and the ability to scale RAS services quickly, but where advanced security and management measures and downtime are not critical concerns.

3Com's SuperStack 1500 has many more features and is more secure than the IRAS-24A, and allows companies to add remote access clients in increments. If your site requires a remote access box that can support the latest in networking features, then the SuperStack 1500 just may be the ticket.

Van Cleve is network project manager at XXCAL Testing Laboratories (www.xxcal.com), a worldwide independent test lab specializing in software and hardware compatibility, functionality and performance testing. XXCAL is headquartered in Los Angeles. You can contact Van Cleve at vancleve@xxcal.com.

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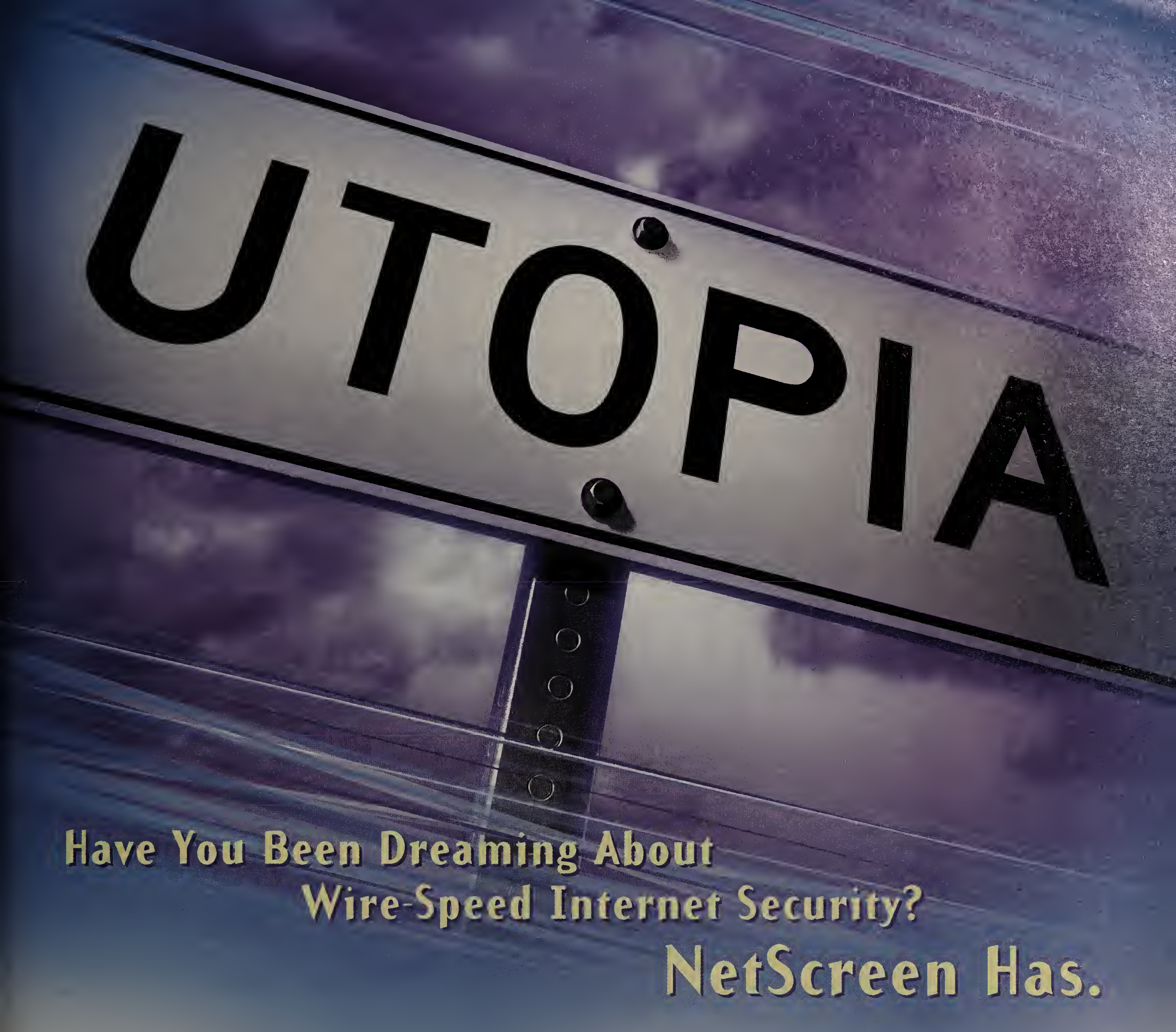

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NT service packs with a smile

Gravity Storm's Service Pack Manager 4.1 provides NT service pack and hot fix relief.

BY BOB CURRIER,
NETWORK WORLD
TEST ALLIANCE

Have you lost count of the number of Windows NT Service Packs you've applied on your servers? Does Microsoft's almost daily release of hot fixes make you hot under the collar? Gravity Storm Software's Service Pack Manager 4.1 is an extremely useful tool that offers some welcome relief to network professionals who have to deal with the barrage of NT upgrades issued by Microsoft. Service Pack Manager performs a network enumeration (Gravity Storm's term for autodiscovery) when it starts, and returns a list of visible NT servers and workstations. You have the ability to query individual machines, complete domains or the entire network. System information is displayed in a status window chock-full of useful information, including data regarding the currently installed version of NT on all available machines, installed service packs and hot fixes, and the dates of installation.Clicking on the browser-based information tab allows you to view the current list of Service Packs available from Microsoft and their associated hot fixes. The integrated browser allows administrators to download upgraded code directly from Microsoft without exiting the Service Pack Manager application.

Once downloaded, NT Service Packs and hot fixes can be propagated across the network with just a few clicks.

However, there are two caveats we need to note in our assessment of this product. Users must have administrative rights on all systems being monitored by Service Pack Manager. And the product makes it almost too easy to install hot fixes. Administrators need to be careful about installing only hot fixes that are required. That's because making system changes for devices or products that aren't installed can lead to an unstable system, or worse, a system crash.

To install a hot fix or Service Pack, you select the desired machines, highlight the appropriate hot fix, and click the install button. When the fix is in, all applications on the target machines are shut down and the computers are automatically rebooted. Service Pack Manager gives administrators the ability to send alerts to targeted machines prior to installation so users can close applications and exit the system.

The program's installation process was a snap. After a quick reboot of the Service Pack Manager console, we were ready to take control of the NT machines for which we had administrator privileges. That's good news, because we would have been in a bind if we'd had to consult the online documentation for assistance in using this product. The help files suffer from unclear writing and poor grammar. Information is sketchy and not well-presented. Given the ease of use of the application and its good performance, this isn't a major problem.

If the installation of the hot fixes on all your machines has become a migraine-inducing problem, we recommend getting a copy of Service Pack Manager 4.1. It is easy to install, a snap to use and provides system administrators with welcome relief from the monotony of Service Pack and hot fix maintenance.

Currier is director of data communications at Duke University in Durham, N.C., and the 1998 Grand Prize winner in the Excellence in Campus Networking competition sponsored by CAUSE, a user group for computer professionals in higher education. He can be reached at bob@bobcurrier.com.

ScoreCard

Service Pack Manager 4.1	
Administration 30%	9
Functionality 30%	9
Performance 20%	9
Installation 10%	10
Documentation 10%	5
Total	8.7

Individual category scores are based on a scale of 1 to 10. **Percentages** are the weight given each category in determining the **total score.**

NetResults

Service Pack Manager 4.1

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Pros
- ▲ Makes hot fix and service pack management simple
- ▲ Easy installation

Cons
- ▼ Documentation sketchy and poorly written

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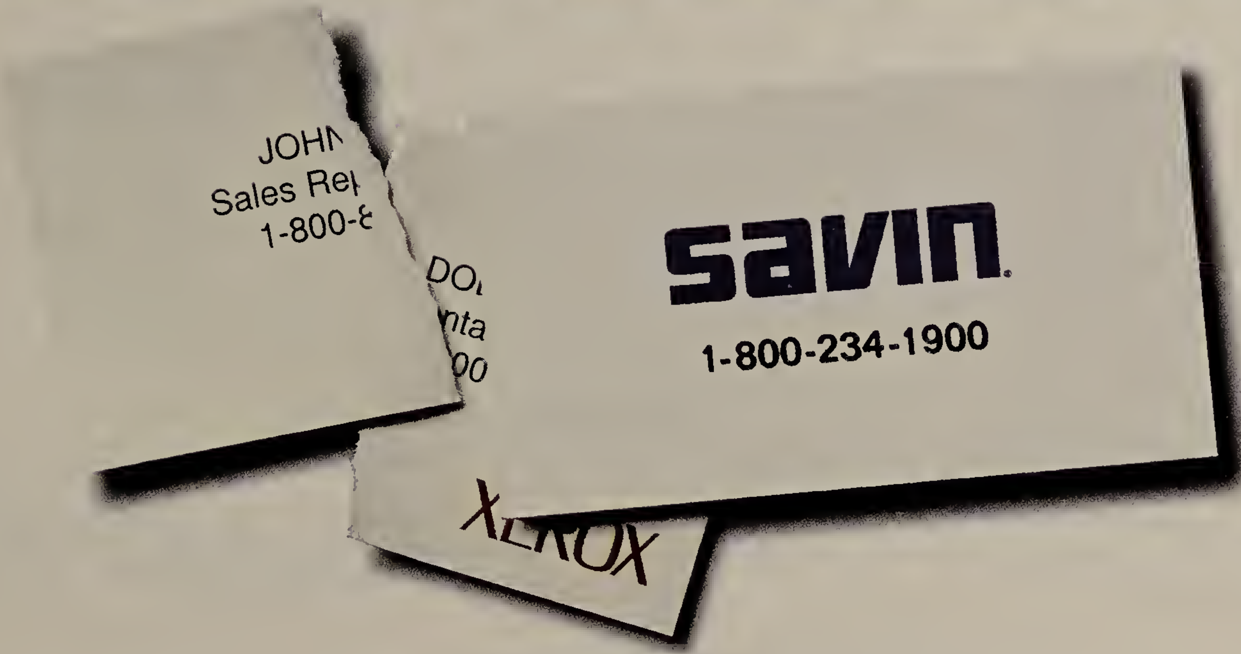

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ALAS, POOR IPSILON, DECNET, ANYLAN

A trip through the network graveyard in search of superior technologies that fell by the wayside and the reasons why.

BY ELISABETH HORWITT

Rob Carter, corporate vice president and chief technology officer for FDX Corp. in Memphis, has no illusions that the best network product always wins. "I've seen great technologies go nowhere for market reasons," he laments.

It wasn't always so. In the industry's early days, engineers ran companies, and technical excellence was what counted most to customers. Marketing was an afterthought at best.

This changed, however, as networks grew to become crucial underpinnings for mission-critical applications. End users and upper management got into the IT purchasing loop. So savvy vendors hired marketing experts and launched major ad campaigns to convince nontechnical buyers that a new switch, server or e-mail package was just what they needed.

As a result, the network graveyard is strewn with the corpses of worthy products and technologies that failed, not through technical shortcomings, but because their vendors miscalculated or were simply outgunned in the marketing wars. This overview explains why several solid products met an untimely demise.

1 Lack of marketing

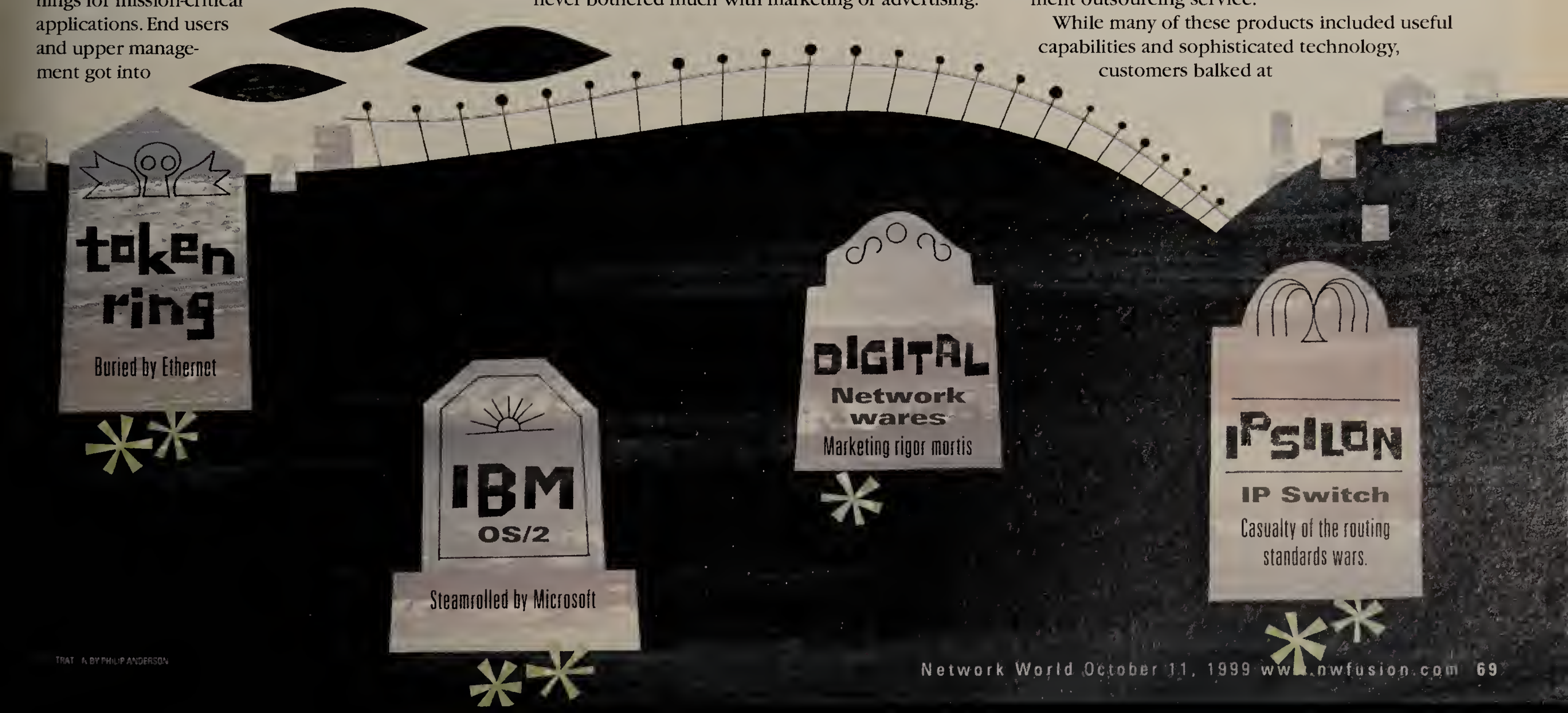
Through the 1980s and into the 1990s, a surprising number of leading vendors maintained the belief that excellence would sell itself, so they never bothered much with marketing or advertising. Banyan was one such company; Digital was another.

"Digital was a company founded and run by engineers whose philosophy was, if the product is good, people will beat a path to your door," says Paul Jorgensen, a former Digital field engineer who is now a network technical specialist at Washoe Health System in Reno, Nev. This belief was one reason why many of Digital's network wares never expanded much beyond the firm's existing customer base.

2 Doesn't fill a need

A related blunder made by marketing-challenged product developers is to assume that customers are as enamored with pure technological sophistication as the developers. Remember those management frameworks of the late '80s that were supposed to handle the entire computing infrastructure, including the kitchen sink? Like Digital's Polycenter and Nynex's Allink, they've all since disappeared, or as was the case with AT&T's Unicenter and British Telecommunications' Concert, they've been incorporated into a network management outsourcing service.

While many of these products included useful capabilities and sophisticated technology, customers balked at



[illegible] BY PHILIP ANDERSON

spending hundreds of thousands of dollars and months or years of implementation time on an amorphous architecture with dubious paybacks.

At the time, customer demand was for modular systems such as Hewlett-Packard's OpenView, and for specific tools to address distinct network management needs, says Frank Dzubeck, president of Communications Network Architects, a Washington, D.C., consultancy.

3 Priced too high

A common cause of a product's demise is a consumer's decision that the extra features or superior capabilities offered by the product aren't worth the added price.

"Token ring was a very elegant way of sharing bandwidth on a LAN," recalls David Passmore, president of NetReference, a consultancy in Sterling, Va. "What killed it was LAN switching because all that matters there is price per port. Ethernet was simpler and supported by more vendors, so it was cheaper to build Ethernet chip sets."

The fact that token ring inventor Olof Soderblom demanded a license fee for every chip set sold didn't help the architecture, either.

In the case of ISDN, it was the service providers who balked at the cost. Because it was expensive to install ISDN in the central office, local carriers in particular were slow to deploy the technology, says Gary Habermann, director of technical resources for Widener University in Chester, Pa. "By the time they did, it wasn't a leading-edge technology anymore, but passé," he says.

These days, digital subscriber line and cable modems are rapidly filling the broadband access market that ISDN targeted. "ISDN won't vanish, its growth will stop dead," says Habermann, whose university still uses ISDN for specialized applications such as videoconferencing.

4 Dueling standards

When multiple vendors, or alliances, simultaneously introduce different technologies that address the same need, the groups often engage in marketing tactics to establish their technology as the de facto industry standard. The loser gets labeled proprietary and fades away. Remember Betamax?

Take 100VG AnyLAN, a 100M bit/sec LAN for twisted-pair wiring that was developed by Hewlett-Packard and initially backed by AT&T Microelectronics and IBM. AnyLAN had good functionality and performance, and wasn't a difficult upgrade from Ethernet, says Fred McClimans, chairman of Current Analysis, a consultancy in Sterling, Va. However, the 100Base-T and 1000Base-T groups touted their work as the next Ethernet standard, although the technology had little to do with Ethernet. Plus, 100Base-T was cheaper.

A much more one-sided standards war pitted Ipsilon against the big switch vendors. Introduced in early 1996, Ipsilon's IP Switch ATM 1600 was heralded as the next network wave, NetReference's Passmore recalls. The device married the speed of switching to the control functions of routing.

Major router vendors were months away from developing a comparable technology. But customers who were closely tied with Bay (now Nortel Networks), Cisco or IBM were willing to wait rather than take a chance on a start-up's proprietary product.

Eventually Cisco rolled out Tag Switching, which became the basis for the widely supported Multiprotocol Label Switching standard. The final blow to Ipsilon's IP switching scheme was the appearance of Application Specific Integrated Circuit-based terabit routing, Passmore says. In late 1997, Nokia bought the company for $120 million — less than 25% of Ipsilon's estimated worth in 1996.

Microsoft is, of course, the undisputed champion when it comes to using its dominance of one market to cut off a competitor's air supply in another. But the titan is hardly alone.

"Microsoft and Netscape gobbled up market share from all the small independent e-mail firms with nice technology and features," Passmore says. "By bundling e-mail into their software, they shut down the marketplace. Look at Qmail. Look at Eudora."

Not all victims of such flank attacks are small and helpless: Take IBM, for example. "OS/2 was a superior product that was clearly well ahead of Windows in functionality, management, single logon and drivers, at least through Windows 2.X," Passmore says.

While IBM sought to drive OS/2 purchases from the top down, Microsoft was capturing the desktop market. Windows had an edge because it evolved from DOS. "And as soon as Microsoft had clear dominance with Office, the game was over. It was too hard to get the suite to work on OS/2," he says.

5 Proprietary apron strings

History has shown that major systems vendors don't always make the best network vendors. Too often, they allowed, or even encouraged, the market to perceive their network business as a sideline to the systems business. By refusing to support other vendors' platforms, the companies effectively limited a product's reach to all but their existing customers.

"Sun's SunNet Manager ran only on Solaris and only managed Solaris systems, not Unix," says John McConnell, president of McConnell Associates in Boulder, Colo. Moreover, the vendor focused on selling its workstations. These decisions are why SunNet Manager lost out to HP OpenView and IBM NetView despite its strengths and eventually moved into the telephone company management niche, he says.

Similarly, "Digital's Vaxcluster and DECnet Phase 4 were great network products for DEC systems," says Jorgensen. "When PCs got popular, there was only one company that made a DECnet stack for PCs." IBM had similar troubles when it tried to pit its Advanced Peer-to-Peer Networking, the nonhost-based version of SNA, against TCP/IP.

Digital took the profits generated by network hardware such as Gigaswitch and fed them into its Alpha product line, McConnell says. As a result, most of the good network engineers left the company, he says.

Survival of the fittest

The death of a product can be frustrating and expensive for network executives who rely upon it. That's why you should research business and market-related factors in addition to technical considerations and cost before you make a major buying decision, says Ed Risinger, president of HealthData Resources, a software manufacturer in Boston. "Products often fail because the market didn't move their way. That's the American system, and it's beautiful."

Horwitt is a freelance writer and consultant in Waban, Mass. She can be reached at EHorwitt@compuserve.com.

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By Richard Smith

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Richard Smith is the Chief Executive Officer of Telcordia Technologies, Inc.

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On the move

What will relocation mean to you and how will your employer help?

Cliff Duffey negotiated a relocation package that took care of all his expenses.

BOB SCHATZ/MPG

BY LISA KOSAN

Cliff Duffey is still unpacking the boxes that arrived at his new home in Nashville a couple weeks ago. But you don't worry too much about the little things — like where you packed the silverware — when you're the new vice president of engineering for BlueStar Communications, a fast-growing competitive local exchange carrier.

Duffey might be new to his job, but he's jaded about relocating. He spent the last two years working in Atlanta and that was after moving between a couple of jobs in Florida.

"I guess I've been around a little bit more often than most," Duffey says. "You learn things."

Your father might have had a career with one company, but the days of collecting fat pensions from a single employer are gone. Relocating to another area of the country is becoming commonplace, especially with unemployment at a 30-year low of 4.2% and an economy that's short about a half-million people with high-tech skills.

If relocation is hot, so are the incentives, says John Challenger, CEO of Challenger, Gray & Christmas, a Chicago outplacement firm.

"Many companies are having a hard time finding someone locally, and they're adopting national strategies in a way they didn't used to . . . so you've got more negotiating room than you think," he says.

Relocation is an investment, so naturally you should do your homework about the company and its location if you're considering an offer. (Go to www.nwfusion.com, DocFinder: 5027 for a collection of several online resources, including cost-of-living calculators and relocation tips.)

You should also take the time to visit an area, compare houses and talk to residents. Better yet, make sure you have a company representative spell out the organization's relocation policy, says Charles Pappalardo, managing director of technology and venture practice for Christian & Timbers, a high-tech executive search firm in Cleveland. He also advises talking to other employees; find out who was relocated and whether they were satisfied.

"But you're never going to know everything," Pappalardo adds. "It's still compensation, and no one likes to say [exactly what they receive]."

Duffey is responsible for network design, implementation and operations for BlueStar, and is also charged with recruiting 30 network engineers. Before he committed himself to the carrier, he met the management team and arranged to work a 60-day contract through his consulting job with Lucent.

"BlueStar's relocation offer made it clear that everything was going to be taken care of," Duffey says. "And they made it as simple as possible."

Streamlining a move and covering the costs is common among midsize to large employers, especially the higher the job, Pappalardo says. Some companies will cover the costs of selling a home, pay for mortgage points and interim housing rental fees, and even hire someone to handle the drudgery of utility hookups. But smaller businesses and start-ups with less cash flow might offer only a standard reimbursement for moving expenses.

Breakaway Solutions started the year with 98 employees and now has 250 among its Boston, Philadelphia and San Mateo, Calif., offices. The application service provider offers to pay relocated employees' moving expenses, according to Samantha Hornung, director of recruiting. Breakaway will also help contact Realtors and ask if anyone in-house knows of housing opportunities.

If you're fielding a relocation offer, be clear about what's covered, Hornung says. You don't want to be surprised about the tax implications of a large reimbursement check or compensation package, she adds.

More than money

And of course, the impact of relocating goes far beyond the dollar signs on your new paycheck. There's tremendous upheaval in your life, from finding a new doctor, to a new favorite restaurant. Your spouse and children have to find new friends, jobs and schools. You'll need a place to live and possibly help selling your house.

Relocation was a big adjustment for Blanco Lam, who last year moved from South Africa to the San Francisco Bay area after a 12-year wait to get his green card. Lam is a network administrator for Acotec, a remote access vendor.

Lam's biggest challenge with relocating wasn't his job. The technology in the U.S. is about six months ahead of South Africa, and that's heaven for a network professional, Lam says. Rather, the headaches involved adjusting to a new corporate culture, socialization, lack of a credit history and the higher cost of living. The $1,300 that Lam pays for his one-bedroom apartment could cover the monthly mortgage on a mansion back home, he says.

"You move up and earn more, but you pay more," Lam says.

Duffey's move required an area with high property growth in case he has to sell his house in two or three years. Nashville fit his criteria of a city with a growing technology base in case he needs to find another job, he says, noting that you should always keep that in mind.

Gordon Quick, the new CEO of Intertech Management Group, a billing and customer care software provider in St. Louis, came from a Dallas carrier that he took public about two months ago. Quick, who says he moves, on average, every three years, has two considerations when assessing an offer: Does the company have a solid market; and what are the driving business principles among board members?

A lifelong sailor, Quick also has a personal commitment to be flexible.

"My move to Indianapolis meant I had to put my boating desires on vacation and do other things," he says. "If you go to a place without an open mind, you're going to be very unhappy."

Kosan is a freelance writer and editor in Beverly, Mass. She can be reached at edit@prodigy.net.

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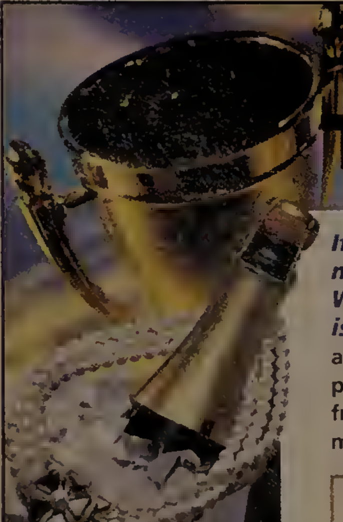

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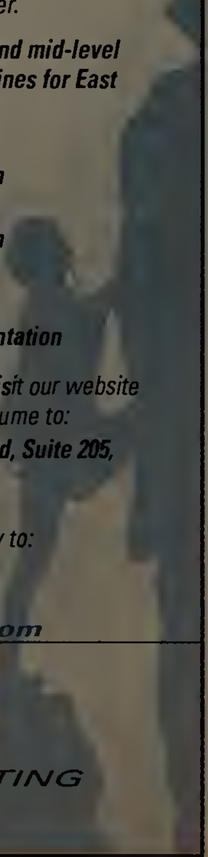

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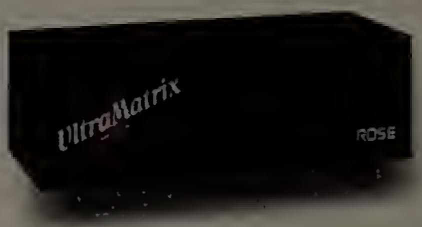

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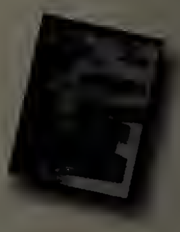

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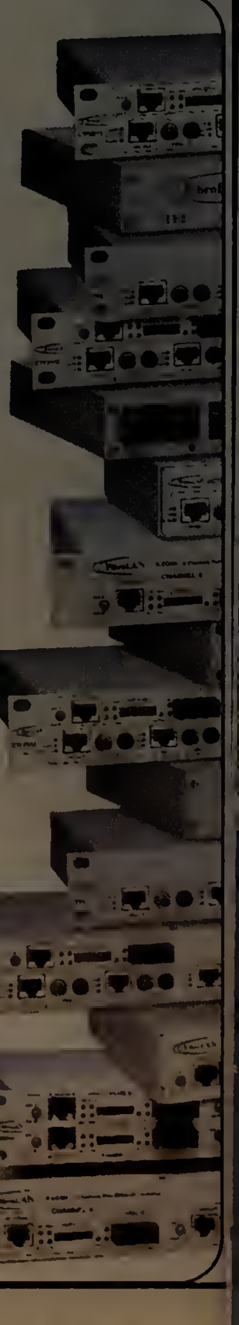

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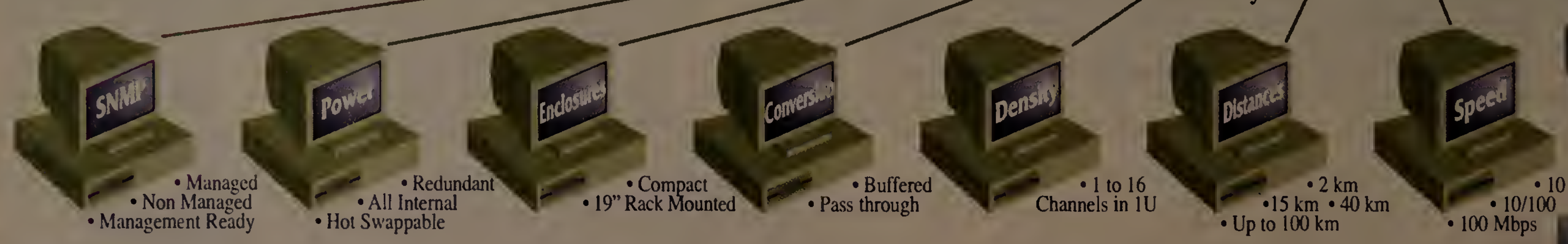

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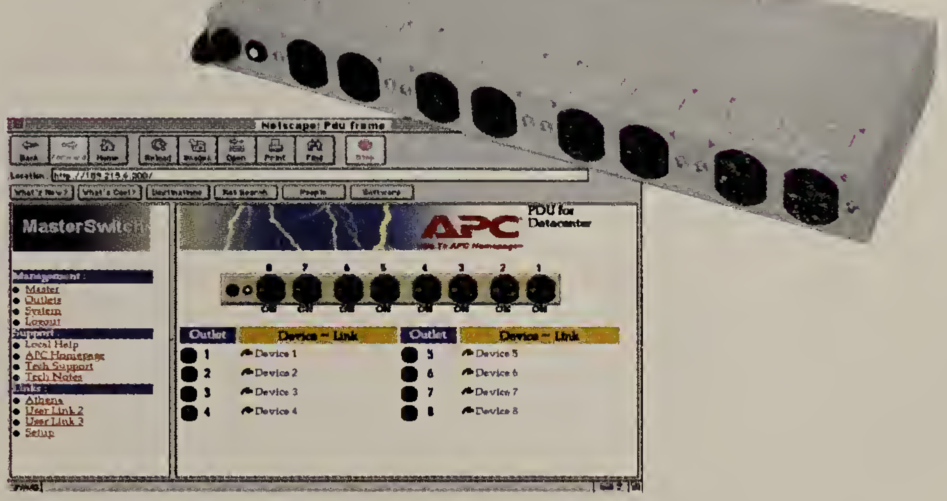

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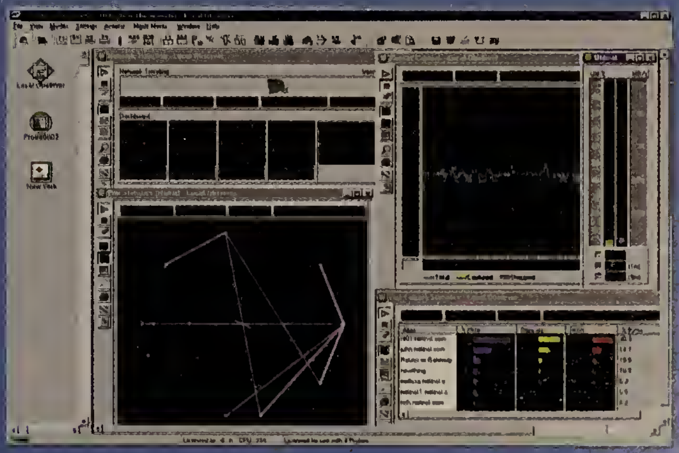

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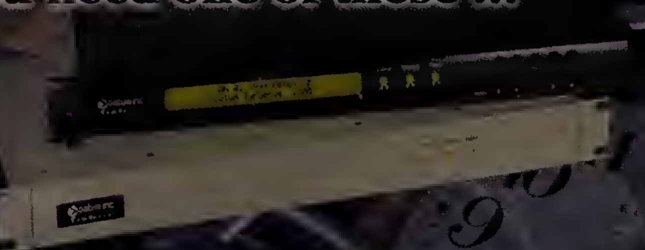

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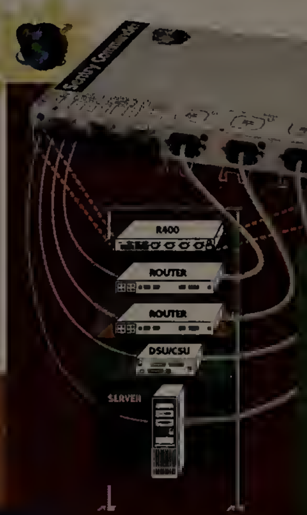

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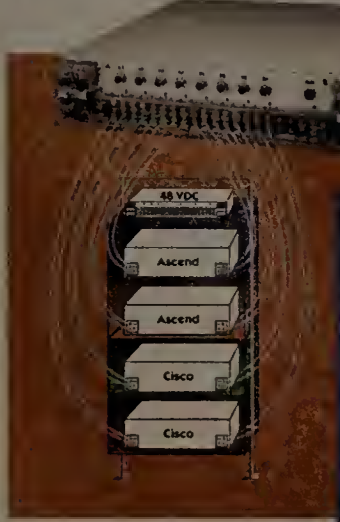

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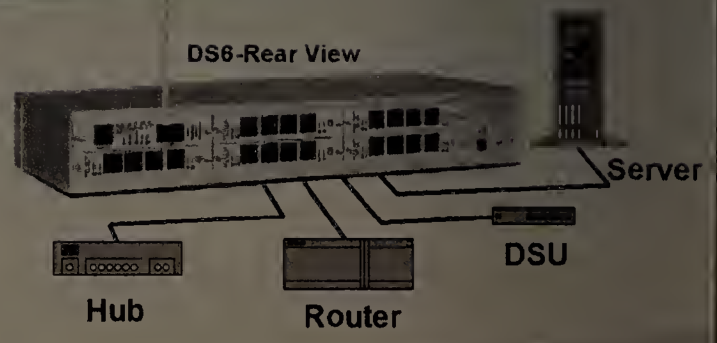

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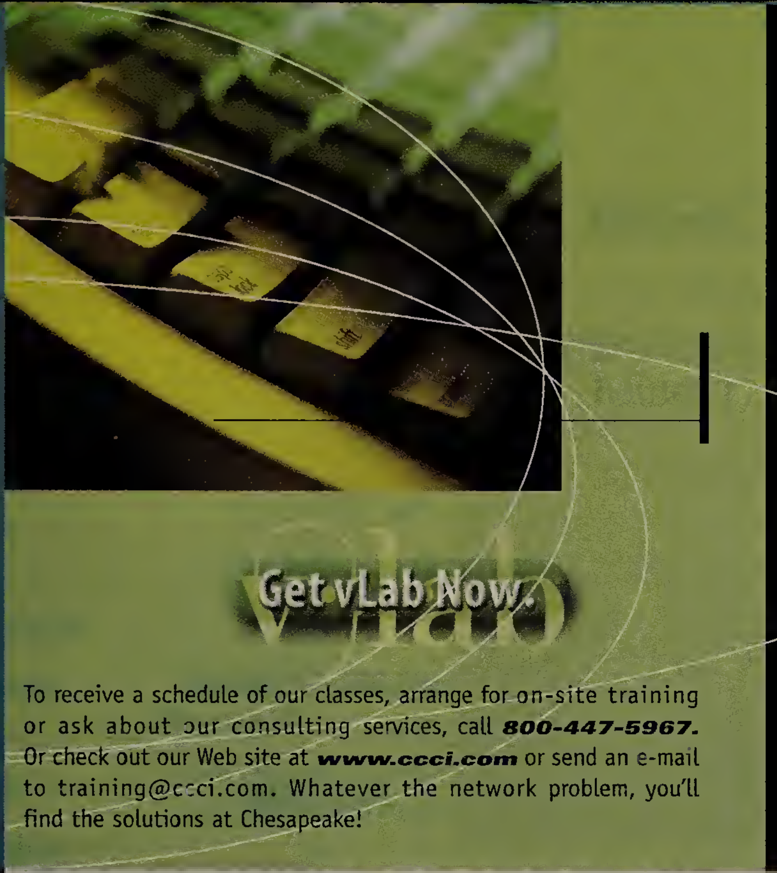

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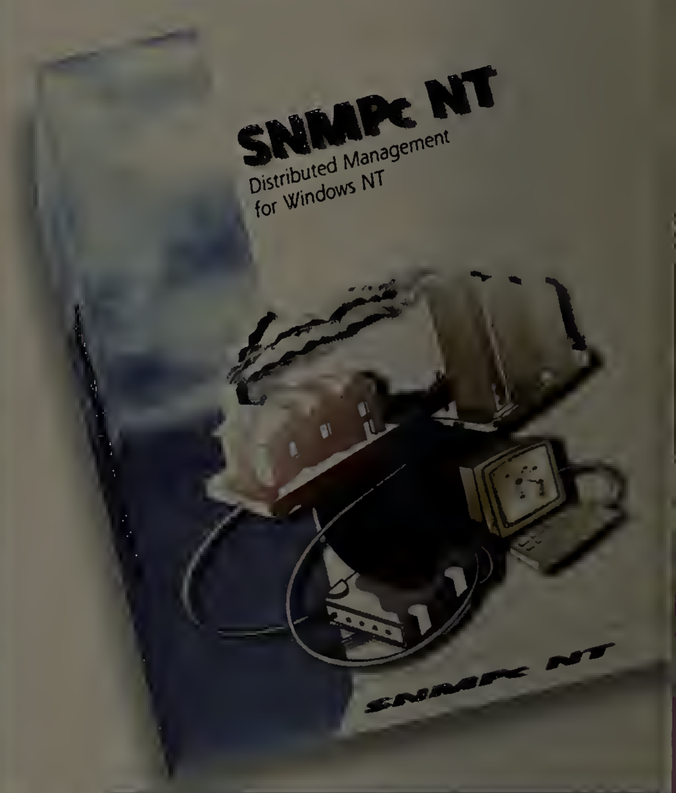

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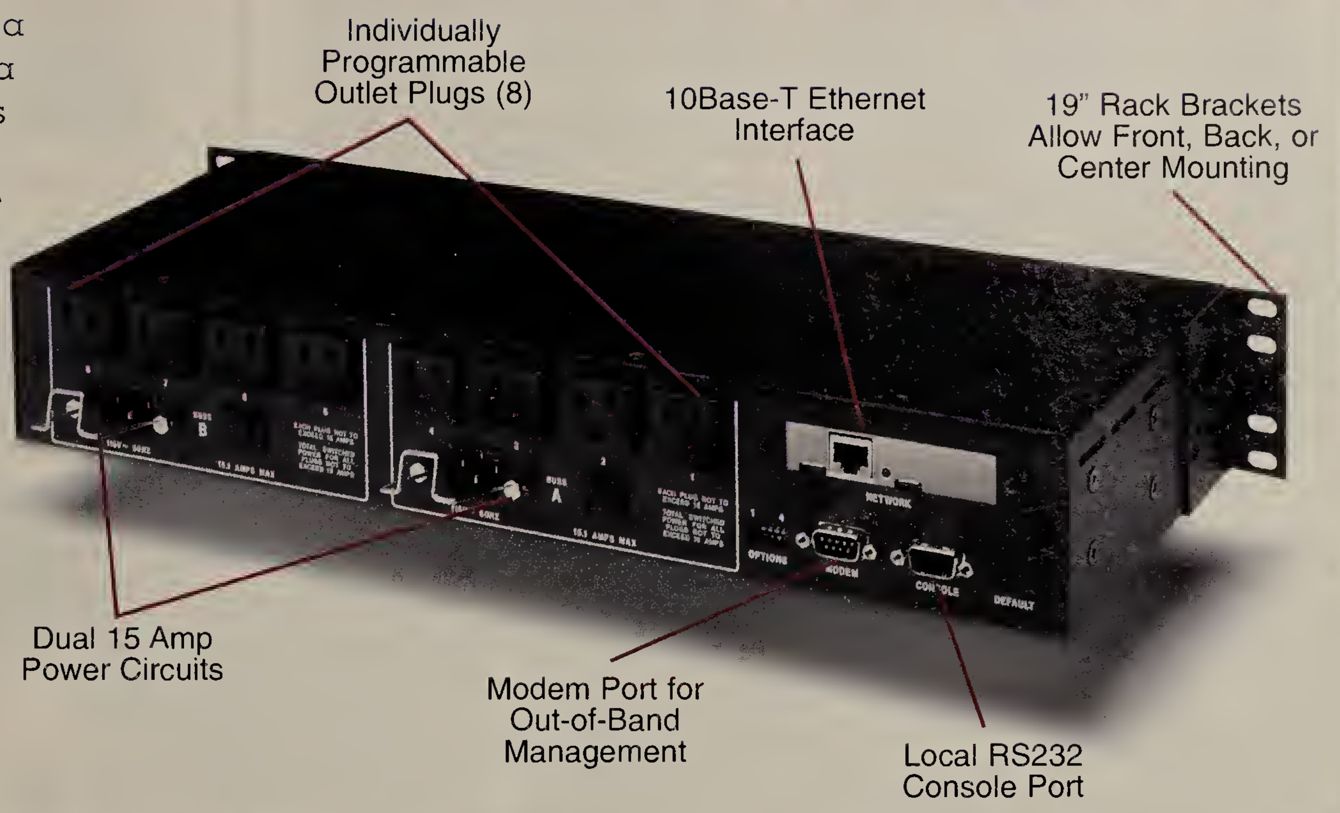
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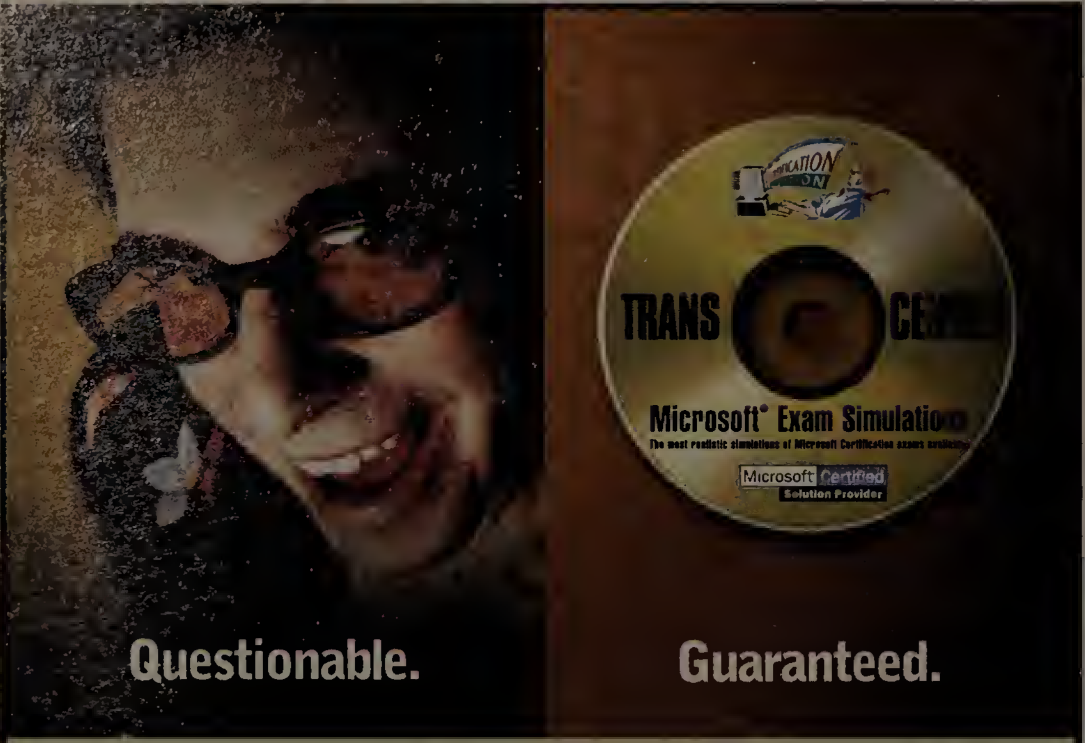
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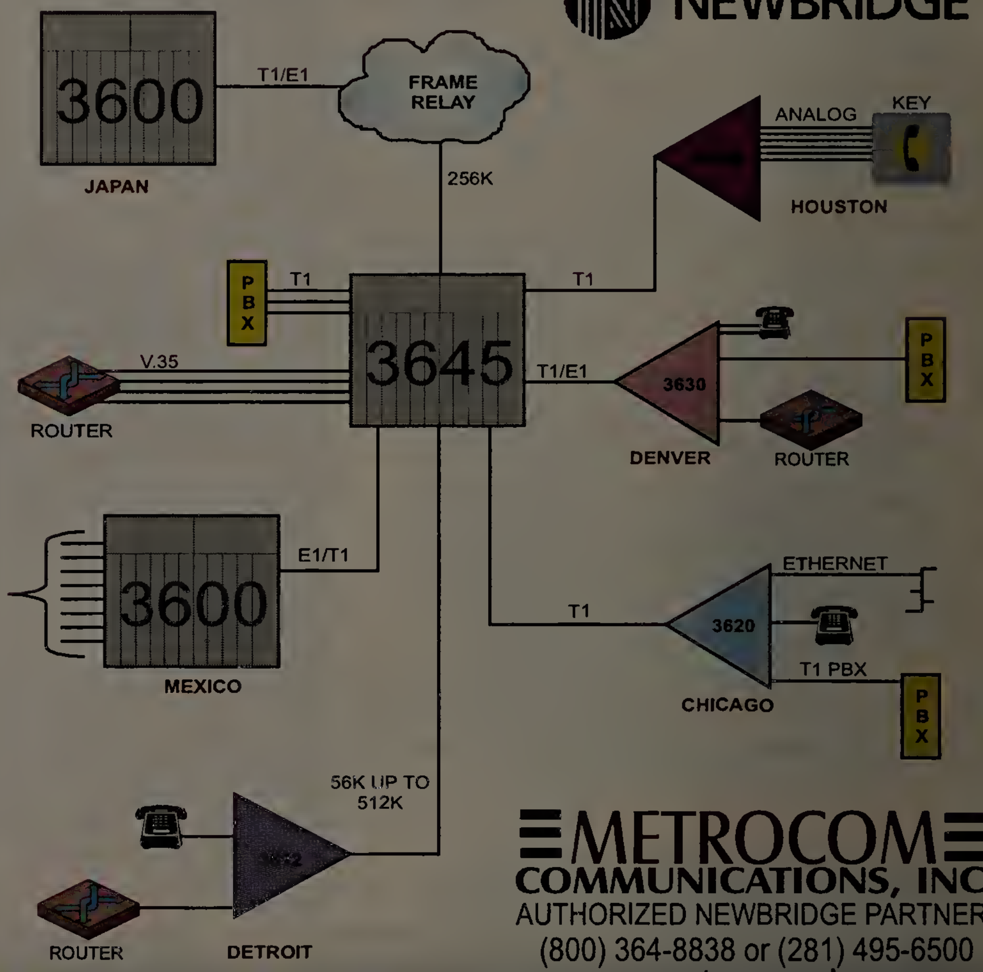

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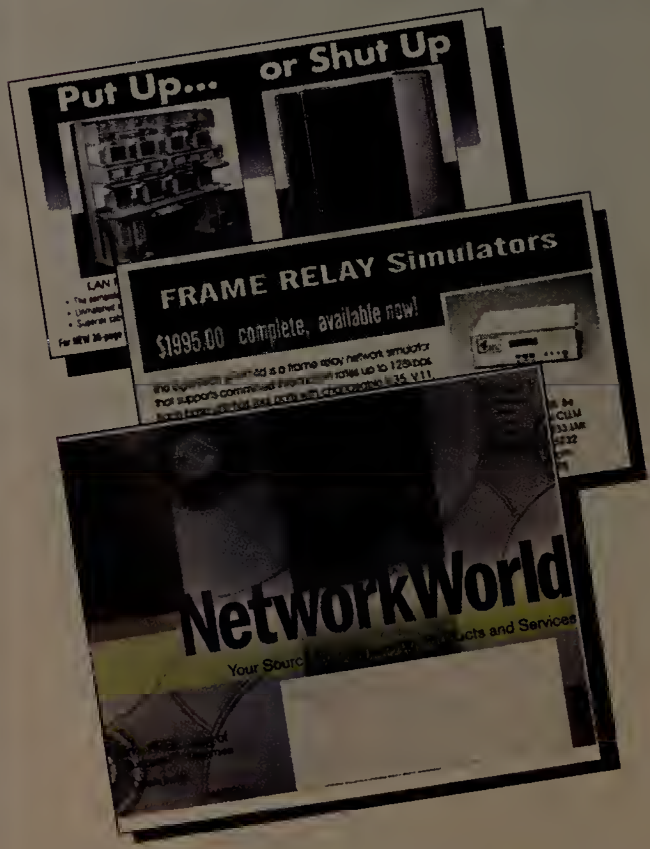

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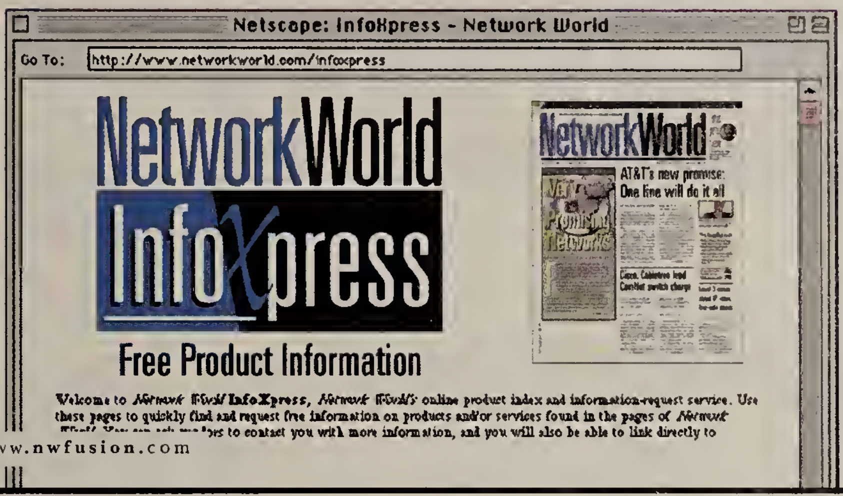
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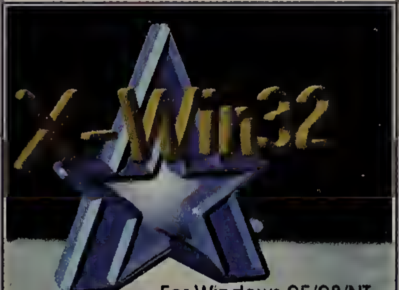

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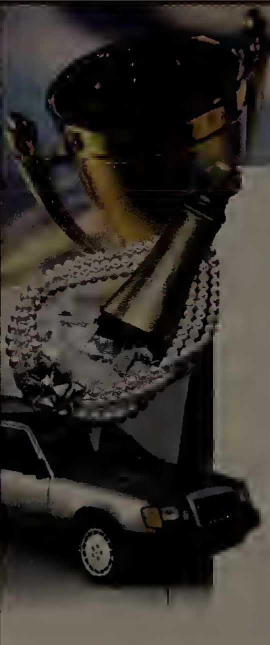

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3Com 6,22,60
A
Alcatel 27
Ameritech 6
Appliant 41
AT&T 1,6,32,69,88
B
Bell Atlantic 6
BellSouth 35
Belobox Networks 22
British Telecommunications 89
Brooktrout Technology 60
C
Callisto 17
Cisco 16
Concert 89
G
Global One 89
Gravity Storm Software 66
GTE 31
H
Hewlett-Packard 17
HolonTech 26
I
IBM 6,17,41,44,54,69
Intel 6
Intershop Communications 41
L
Lotus 10
M
MCI WorldCom 1,54,88,89
Microsoft 6,10,31
N
Network Integrity 17
Nortel Networks 16,31
Novazen 41
Nuera 16
O
Optel Communications 31
Oracle 1
R
RCN 31
Rhythms NetConnections 31
S
Scriptics 42
Sprint 1,16,88,89
Sun 17
V
VASCO Data Security International 6
Visionael 41

ADVERTISER INDEX

Advertiser	Reader Service#	Page#	URL
ACI International	245	78	www.aci.com
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*Intel Corp		23	www.intel.com
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Telcordia	54	71	www.telcordia.com
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*Visionael Corp		39	www.visionael.com
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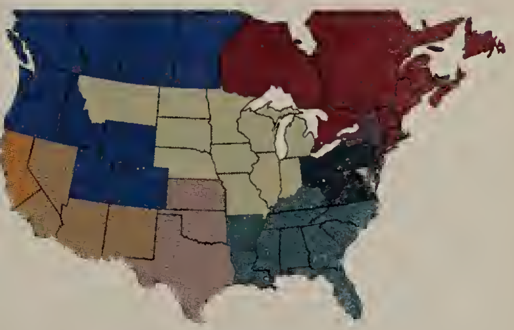

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Oracle,

continued from page 1

from $5 to $695 monthly.

For corporate users, the initial savings can be hundreds of thousands, even millions, of dollars in the cost of software, hardware, networks, consultants and training to deploy these complex applications internally, Oracle claims. BOL and similar ASP services can slash weeks, even months, from the time it takes to get end users up and running.

The economic benefits of such services, at least for brand-new companies, can be breathtaking, as start-up Triton Network Systems found.

"When I came here, Triton was looking at installing SAP AG's R/3 business suite, and Triton was quoted $500,000," says Carryl Smith, Triton's chief information officer. "The company had about 70 people at the time." In fact, Smith estimated the final cost would be closer to $1 million, assuming they could even find the minimum four-person staff he knew would be needed.

Ellison said an Oracle customer's average cost per user, based on pilot programs running since February, is from $400 to $500, depending on how many applications the customer licenses. An Oracle public relations staffer says Oracle offers a monthly BOL fee, including the application license, support and the BOL hosting, ranging from $150 to $895 per user. She said "implementation and transport" were extra, but she was unable to explain what these terms meant, or what the extra cost was.

The speed of ASP deployment is also a compelling lure. InternetCo Investments is a 5-month-old Sao Paulo, Brazil, firm that invests solely in Internet start-ups. "We couldn't take six months of meeting with programmers and project managers to set this up," says Management Partner Pedro Mello. "To our astonishment, BOL took just a week for us to be up and running. We have PCs with Web browsers, and we have access to all the company's figures."

> **"The software industry is in the midst of a huge, huge change: Software is becoming a service."**
>
> Larry Ellison, chairman, Oracle

Oracle has been aggressively going after the emerging ASP market, seeing its applications as an asset that users can, for a price, exploit via the Internet.

"Oracle is in a uniquely strong position as a software vendor to be an ASP," says Clare Gillan, an analyst for International Data Corp. in Framingham, Mass. "They have demonstrated strength as a consulting services company. And they have the database, the tools, the applications, the whole technology 'stack' to do this."

These strengths seem to be paying off. So far, BOL has an excellent track record. Performance over a WAN is very good, according to several users. Most customers, Ellison said, are opting to access the applications via a virtual private network.

There have been no outages, say Smith and Mello. Data security at a professionally managed data center site is actually better than a small start-up can hope to provide in-house, Smith says.

IDC's Gillan says the market for ASP services will skyrocket from $140 million this year to $2 billion in 2003. That kind of money is drawing a lot of interest and not just by Oracle's traditional packaged software rivals, such as SAP AG or PeopleSoft, Gillan says. Also crowding in are network and other service providers who want to host SAP and other software packages and offer a service just like Oracle BOL.

But the ASP market is so new, questions remain. How applicable is this approach to companies that have already invested in a computer network to run this software? Oracle, for example, is talking with its existing customers, but no migration path has been announced. ◪

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Staples,

continued from page 1

MARK WILSON

Staples' Jed Dineen says his company has faith in ATM's future.

work are programs in Staples store kiosks that let customers build, configure and customize an IBM, Hewlett-Packard or Compaq computer before they buy it. The kiosks improve a shopper's selection options while reducing inventory and cost for Staples.

"This application wouldn't have functioned in the old environment," Dineen says. "The new network allows for an improved shopping experience, lower costs and an improved selection of goods for sale. Staples reduces the cost and hassle of doing business for our customers."

The firm has started or completed the deployment of more than 15 customer service-oriented applications since installing the net, he says. The net allows the firm to plan for increased capacity as applications are approved and should serve Staples well into the future, he says.

For example, the new frame relay network lets Staples increase a store's network access bandwidth and committed information rate (CIR) during peak transaction periods, he says. A phone call to service provider AT&T can increase the pipe at 100 stores from 64K bit/sec with a CIR of 16K bit/sec, to 128K bit/sec with a CIR of 32K bit/sec or 64K bit/sec for increased traffic loads, he says.

The T-1s have also helped Staples reduce WAN costs for voice. Four separate voice circuits in each store were replaced with four 64K bit/sec DS-0 channels in a T-1 for an annual savings of $120,000.

Frame relay circuits from the stores come into two Nortel Backbone Concentrator Node (BCN) routers at headquarters. The BCNs are also equipped with Nortel's ATM Routing Engine modules to handle routing around Staples' ATM campus net, which is based on two Nortel Centillion 1600s in the core and a System 5000BH ATM switch in each of the building's 27 wiring closets.

The 5000BHs are connected to the 1600s via redundant, load-balanced OC-3 uplinks. The 1600s also have redundant LAN Emulation and Broadcast and Unknown servers on each chassis. If one server goes, another performs media access control-to-ATM address resolution and broadcast services.

Staples went with ATM over other high-speed LANs, such as Gigabit Ethernet, due to the maturity of the technology. The decision was made 18 to 24 months ago when Gigabit Ethernet standards were still in flux.

"I wasn't going to roll close to $2 million of Staples' money on maybe — maybe it'll work, maybe it'll be standardized, maybe it'll be wonderful," Dineen says, referring to Gigabit Ethernet. "Staples is committed to staying one giant step behind the bleeding edge. It ain't a science project."

Staples' choice of ATM doesn't jibe with Nortel's campus LAN strategy, which is to migrate ATM users to Gigabit Ethernet. Nortel essentially sees ATM as a WAN-only technology and is not investing heavily in campus ATM. Also, Nortel's Centillion 1600 switch is a private-labeled version of NEC's core ATM switch. Nortel or NEC could allow that OEM arrangement to expire.

Dineen remains undaunted.

"I made a big investment in ATM," he says. "They sold me ATM. They're going to keep supporting ATM for a while because I made a big bet on it." ◪

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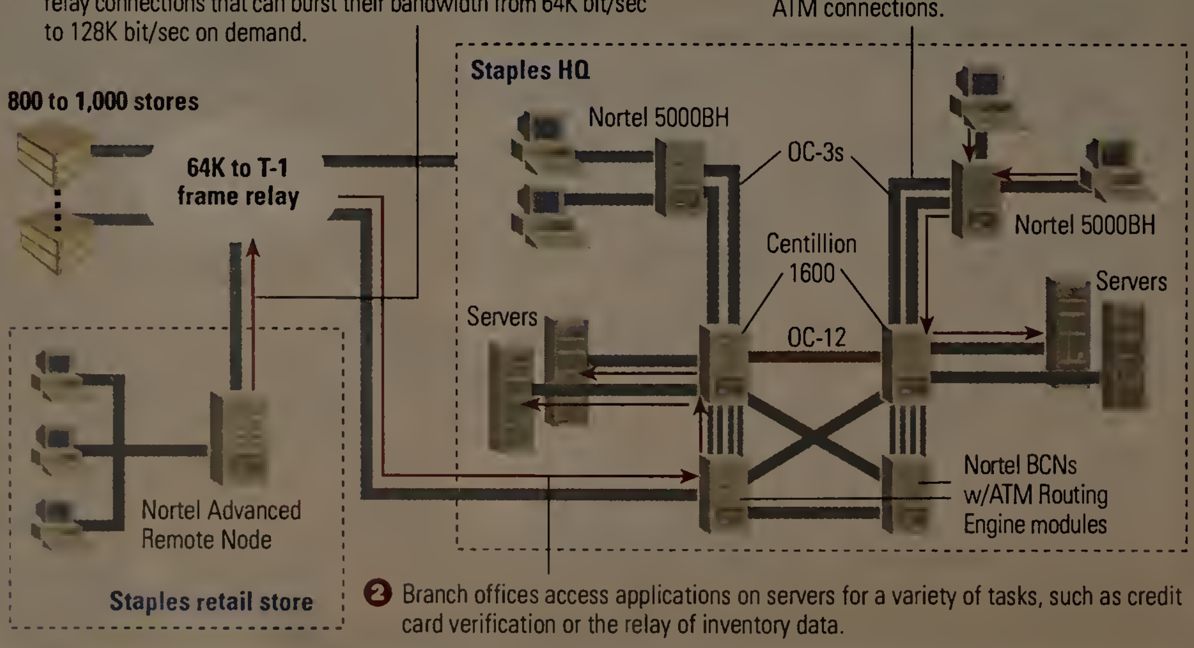
A network staple

ATM and frame relay are helping office products giant Staples improve customer service by speeding credit authorization and keeping store shelves stocked.



❶ Branch offices are linked to Staples' headquarters via frame relay connections that can burst their bandwidth from 64K bit/sec to 128K bit/sec on demand.

❷ Branch offices access applications on servers for a variety of tasks, such as credit card verification or the relay of inventory data.

❸ Internal clients are attached to Staples' high-speed LAN access servers via redundant ATM connections.

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NETWORK INTEGRATION CHALLENGES ABOUND

Anywhere you look, MCI WorldCom and Sprint have a massive integration job ahead of them.

Before the Sprint merger agreement, MCI WorldCom favored moving its Nortel Networks-based legacy MCI frame relay network to a Lucent platform because the legacy WorldCom network and MCI WorldCom's UUNET heavily rely on Lucent's frame relay switches. But Sprint's fully redundant dual networks run on Alcatel and Nortel switches; so the merger only compounds this problem.

Lucent was absolved of contributing to MCI WorldCom's August frame relay outage, so CEO Bernard Ebbers could still choose to revive the single-network plan. But he'd be wise to retain Sprint's dual-network philosophy.

The status of the combined company's ATM nets is similar. Sprint uses NEC ATM switches for core transport of all its data services but relies on Nortel and Hitachi switches at the edge. The legacy MCI Newbridge Networks-based ATM network is not compatible with Lucent frame relay switches capable of supporting Multi-protocol Label Switching, so MCI WorldCom has planned to migrate legacy MCI customers to its chosen ATM equipment vendor — Cisco. I anticipate that the merged carrier's net will heavily feature Cisco and NEC switches.

Lisa Pierce

The firm faces yet another challenge with its 'Net assets. If the new WorldCom decides to retain Sprint's IP net, I'd say UUNET's market strength would require Sprint's current 460+ routers to be migrated to a UUNET-compatible architecture no later than six months after the merger's completion.

The merger provides MCI WorldCom with an opportunity to integrate the best networks, operations and talent from the three carriers. But the merger requires recognition that MCI WorldCom's current operating philosophy and execution have to radically change if the firm is to successfully compete against AT&T. Has Ebbers seen the light? I'm skeptical but welcome being proven wrong. Regardless, the merged carrier will have far too much capacity and will divest itself of up to 20% of existing data and 25% to 30% of its circuit-switched assets.

Even perfect execution of a stellar plan takes time, and AT&T and WorldCom will not have viable business-class nationwide competitors for the time being. In the interim, price, quality and innovation will lag, and enterprise customers should divide primary service coverage between these two carriers. Although this is more costly than bundling everything with one provider, the absence of a "third wheel" makes it the only way to diversify risk and keep both AT&T and WorldCom on their toes.

Pierce is a telecom analyst for Giga Information Group in Cambridge, Mass.

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Robert Wescott
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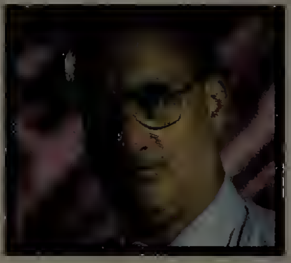
OF ALL POSSIBLE PARTNERS, WHY MCI WORLDCOM?

Why is Sprint selling? It didn't have to.

Sprint has an enviable hand in wireless and a surprisingly loyal customer base. Let me ask you this: What company with a single-digit market share, outside of Apple, has Sprint's brand recognition? None. But assume for a moment that Sprint was amenable to an offer. Why MCI WorldCom?


Howard Anderson

MCI WorldCom had one glaring hole in its armament: wireless. It saw AT&T go to market with its One Rate Plan, combining minutes of use from long-distance and wireless. MCI WorldCom couldn't match that. In fact, one of MCI WorldCom's strategic mistakes is that it failed to understand the importance of wireless three times. And MCI WorldCom passed on Nextel three times.

So what is worth $115 billion? The long-distance business? That's probably worth $25 billion. Actually, long-distance is a rotten business. Twenty-five percent of American homes change their long-distance carriers each year. It's a business of ever-decreasing margins, high churn rates and high advertising.

Sprint has a bevy of local communications companies, vestiges of its predecessor company, United Telecommunications. The local businesses have a worth of maybe $35 billion. Internet? Probably worth $20 billion. Hell, everything that has "Internet" attached to it is worth some number of billions. Global? This is one part of Sprint's business that is suffering. The global alliance between Sprint, the French and the Germans has not worked well. The partners seemed always to communicate by rumor.

The residual? Sprint's PCS business. Sprint took a real gamble with wireless. The carrier bid early, often and high. But Sprint fashioned a nationwide offering. The carrier worked the distribution angle well, aligning with Radio Shack.

Sprint has also built a superb infrastructure and always has been the early adopter. For 1½ years, Sprint was the only company getting behind wave division multiplexing and was Ciena's only customer.

Where does this leave AT&T? AT&T is fully deployed and will be very busy on all fronts. CEO C. Michael Armstrong has to get this team to work and work well; he has a massive job in retrofitting MediaOne and TCI; he just lost Leo Hindery, his cable guru, and six months ago he lost Bob Annunziata, who was the brain and brawn behind Teleport, AT&T's local phone business.

So what do we make of MCI WorldCom CEO Bernard Ebbers? Did he overpay for Sprint? Of course. Does it matter? Probably not. For one thing, he keeps Sprint out of the hands of BellSouth and the Europeans, both of which could be formidable competitors. He gains market share and he gains access to local markets, which is important to him. As long as the stock market buys his act, he is playing with almost free money.

Anderson is president of The Yankee Group, a telecom and network consulting firm based in Boston.

EVERYONE'S JOB JUST GOT A BIT HARDER

As a telecom consultant in the business of maximizing end users' network and economic efficiencies, I can see my job just got a lot harder. And so has yours.

For businesses with robust, expansive network requirements, the "three-party system" in the long-distance industry at least bred some degree of credible competition.

In the pecking order of the competitive landscape, Sprint demonstrated its ability to be somewhat nimble. Whereas legacy WorldCom once poached the market on price, eliminating Sprint as a contender will surely result in increased costs, decreased accountability in service-level agreements and less flexibility for most business end users not offering up a million-plus in monthly carrier billings.

My advice to telecom managers? Time to start experimenting with those second-tier players and hope that the Federal Communications Commission provides a respectable replacement by letting a few major regional Bell operating companies into long-distance.

David Bower

Timing is everything right now due to the enormous market share and technological might MCI WorldCom/Sprint would possess. Your best bets are Qwest, Frontier and Cable & Wireless. For them, this merger presents a great opportunity, because under the MCI WorldCom culture you get pricing barely less than AT&T's — and the hardball negotiating posture to go with it.

But you'll have to plan on adding another three months to the request for proposal process to conduct alternative carrier due diligence and devise a migration plan. It will be an interesting challenge for the new carriers to establish network service integrity and capabilities that can be included in all elements of upcoming RFP invitations from major end users.

Ending up with two players owning the overwhelming majority of the market with very similar service terms and rates will have a major impact on carrier contracts over at least the next 24 months. It's difficult enough to negotiate favorable terms with an incumbent carrier when facing the mammoth task of migrating existing network facilities.

So consider what it will be like when there is no alternative that can muster the resources to legitimize a competitive threat. Losing Sprint will create a void in the market for securing precedent-setting carrier services agreements.

Bower is president of InTelesystems, a consulting firm based in Dallas that negotiates user contracts with carriers.

INTERNATIONAL MUSICAL CHAIRS ONCE AGAIN

A few years ago it appeared that there would be three major global telecom alliances: AT&T/WorldPartners/Unisource, British Telecommunications and MCI's Concert, and Sprint's Global One. Now all that's changed.

Global One was fairly well along the path of self-destruction before the MCI WorldCom/Sprint merger announcement. We can now anticipate that Global One will either go out of existence or, at the very least, wither away. France Telecom and Deutsche Telekom will each sell their stakes in Sprint for more or less than $10 billion each. They may redefine some form of a venture between them, but unraveling the current Global One venture may prevent that from occurring any time soon.

AT&T and BT are now creating a newly defined version of Concert. And although MCI WorldCom lost its part of Concert, the carrier on its own is emerging as the other major supercarrier in the global telecom marketplace. What's more, MCI WorldCom didn't need much from Sprint on this front. MCI WorldCom already had substantial assets and capabilities to provide international business services. It owns or has an interest in international fiber cables (Gemini) and has regional networks (Ulysses) around the world. And through its MFS and other units, MCI WorldCom has a large number of foreign cities wired with fiber.

Still, users should expect a period of continued confusion in the international marketplace. It will take AT&T and BT at least a year before their Concert venture is defined, separate networks are interconnected, and pricing, operational issues and customer-ownership issues are worked out.

Likewise, MCI WorldCom and Sprint will have to plow through roughly a year dealing with regulators before their merger will receive final approval. Only then can much of the integration of the two companies take place.

While all this activity is occurring, the basic cost for international telecom services between the U.S. and Europe, and within Europe, is rapidly decreasing. Large numbers of new competitors are developing in the European marketplace to provide all sorts of local and long-distance bandwidth. This should provide yet another acquisition feeding frenzy in the near future for the major players.

Len Elfenbein is president of Lynx Technologies, a Fairfield, N.J., consultancy and integrator for international telecom networks.

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Backspin

A firm investment in high tech

JESUS SAVES! But wouldn't it be better if he had invested?

— Men's restroom, American University, Washington, D.C.

Investment in technology is what it is all about. If you want to stay ahead of the game, get on the inside and spend your way to having a market edge. That's what the Internet economy is being driven by: Buying positions in the market.

It used to be that we talked about the cost of market entry in terms of thousands or millions of dollars per point of market share. Now we have to start talking about gazillions of dollars for a share of a market that is effectively negatively capitalized! Wonderful! I love this stuff.

MARK GIBBS

Now, while we're on the subject of investment, according to The Philadelphia Inquirer (Oct. 3, 1999), the Central Intelligence Agency is planning to invest in high-tech companies to develop advanced intelligence-gathering tools.

The Firm (as I believe insiders call the CIA), is actually establishing a venture capital operation in both Washington, D.C., and Palo Alto called — and this is the truth, honest — In-Q-It. The name is derived from "In" for intelligence, "It" for information technology, while the "Q" (I kid you not) honors the chief geek in Ian Spelling's James Bond stories.

The Firm's firm will be headed by one Gilman "The Exterminator" Louie (OK, so I made up the nickname), whose background is apparently building and running a toy company that was acquired by Hasbro. Come on, how suitable is that for a CIA operation? Surely he must have terminated at least one person with extreme prejudice to qualify? At the very least a really hostile takeover aided with a bazooka — anything but just toys.

In-Q-It will have roughly 20 employees. (Will they all wear black suits, have suspicious bulges under their jackets, and earphones they keep pressing into their ears?)

To help the CIA in its establishment of their investment operation, the VC firm of Fisher Draper Jurvetson recently sent out a press release with some free advice. "The term 'taking out' is a little different out here," it said. "When we do it, we're taking a company public." And "You will find that the entrepreneurs always have better information on you than you do on them."

My favorites were, "'Hits' are what we call visits to Web sites, not what you know them as," and "Change the name. Nothing is centralized here in Silicon Valley."

Joking aside, this really is the way of the future. The scale of the high-tech world is such that no organization, even one with the reach and power of the CIA, can achieve its goals without being intimately involved in the high-tech marketplace. But just think of what that implies: Spooks playing politics in all sorts of corporate settings.

Of course, common sense tells you that the Firm already has people planted in scores of high-tech companies and In-Q-It is just another means to achieve its goals. But what will be the consequences? What does it mean to have the CIA "inside" the industry? To entertain the idea that they won't manipulate the market and computer products to make intelligence gathering easier is naive.

I wonder when we'll see the first real consequence of this meddling. Will a major flaw in a major product be found to be the result of a CIA-sponsored back door? Will a product deployed in your organization be found to be passing information to the Firm? Would the CIA pass confidential data covertly acquired from one high-tech firm to another to further its goals at the expense of the former?

Intelligence, central or otherwise, to nwcolumn@gibbs.com.

'NET BUZZ

The latest on the Internet/intranet industry

PAUL MCNAMARA

Let's see a show of hands: How many of you have faith in the validity of the typical Web-based opinion poll?

Aha! Just as I thought. Not many hands are up . . . . Yet these polls continue to proliferate like celebrity would-be politicians.

The trouble with Web-based opinion polling, of course, is that most online surveys measure nothing more than the views of a demographically skewed, self-selected sample of people with too much time on their hands. Dress the results up with colorful pie charts and bar graphs, however, and they manage to project an air of legitimacy, especially to the uninitiated consumer.

While reputable outfits such as the **Harris Poll Online** claim they can overcome this inherent bias through shear sample size and compensatory formulas, the fact remains that most Web polls are scarcely worth the pixels with which they are presented.

"Virtually all of the time, Web sites don't put in sufficient disclaimers about these things," says **Camilo Wilson, founder of Cogix Corp.** Based in San Rafael, Calif., Cogix makes online polling software called ViewsFlash that is used by the likes of **Lycos, Sony Music** and **KBKids.com.**

"There are certain uses for these things that are much more appropriate than others," acknowledges Wilson, who says his company counsels its clients on such matters. "Asking people what they think about the site they're visiting makes perfectly good sense . . . . Where you probably would get into trouble is where you say, 'What do you think of what's going on in Kosovo?' "

In other words, if eBay wants to ask eBay visitors what they think of eBay policies, then presenting the questions to a random sample of visitors should produce useful results, especially if reasonable incentives are offered. (ViewsFlash can make this type of polling happen.) However, forget the random part and let any visitor who pleases fill out a Web form, then all you've got is the collective wisdom of eBayers who like to fill out Web forms.

Moreover, ask the same bunch what they think of, oh, say Internet sales taxes, and you've got yourself a pile of data that is hopelessly polluted by a variety of biases, not the least of which is blatant self-interest.

Here's a Web-poll question I saw on a competing news site this morning: "Will you buy the new $999 iMac?"

Let's see another show of hands: How many of you think the results of that poll will say anything useful about the new iMac?

Good, I don't see any hands.

Perhaps it is true that a person can never be too thin or too wealthy. But you can be too connected to the Internet.

A press release arrived the other day from GoAmerica Communications touting Law-On-The-Go, a service that will let lawyers who subscribe to the Go.Web wireless Internet service access Lexis research information via pagers and other handheld devices. The release suggested attorneys might use this service while in court.

Sure, TV's Ally McBeal might turn her attention from a trial to find out whether it's Al Green or Teddy Pendergrass singing whatever Motown song is tormenting her this week. But my guess is that real lawyers will find such gimmickry more amusing than productive.

Remember that old saying about how kissing a smoker is like licking an ashtray? Well, this week's Time-Wasting Tip (TWT) comes from the Brown & Williamson Tobacco Co., via **'Net Buzz reader Susan Shelby.**

"Paul, you gotta listen to this one," writes Shelby, corporate communications manager at HarvardNet. "I know it has nothing to do with technology, but it's making the rounds of the Internet."

Go ahead and dial 1 (800) 578-7453 . . . . You may never think of Big Tobacco quite the same way again.

Funnel all TWTs and Internet news items to McNamara at (508) 820-7471 or buzz@nww.com.

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